



Green Climate Fund Project

“Enabling Implementation of Forest Sector Reform in Georgia to Reduce GHG Emissions from Forest Degradation”

Feasibility Study

Enabling Implementation of Forest Sector Reform in Georgia to Reduce GHG Emissions from Forest Degradation

Feasibility Study

Client

GIZ

Authors (in alphabetical order)

George Abulashvili, Energy Efficiency Center Georgia
Gulbahar Abdurasulova, UNIQUE forestry and land use GmbH
Goga Baghaturia, Independent Consultant
Paul Borsy, UNIQUE forestry and land use GmbH
Liana Garibashvili, Energy Efficiency Center Georgia
Seth Landau, E Co.
Dr. Giorgi Kavtaradze, Independent Consultant
Laura Kiff, UNIQUE forestry and land use GmbH
Marina Olshanskaya, AvantGarde Energy
Tamar Pataridze, Independent Consultant
Matthias Seebauer, UNIQUE forestry and land use GmbH
Dr. Axel Weinreich, UNIQUE forestry and land use GmbH

Date: 31.03.2020

TABLE OF CONTENTS

List of tables	vii
List of figures	xi
List of info boxes.....	xv
List of abbreviations	xvi
Units	xx
Other Notes and considerations	xx
Executive summary	xxi
1 Country and sector profiles	1
1.1 Country profile	1
1.2 Socio-economic profile	2
1.2.1 Demographic and social context	2
1.2.2 Economy and governmental debt	4
1.3 Environment profile	6
1.4 Forest profile.....	15
1.5 Energy profile.....	18
2 Institutional, policy and regulatory framework	21
2.1 Institutional framework	21
2.1.1 Forest Sector.....	24
2.1.2 Energy sector	28
2.2 Forest policy and regulations.....	29
2.3 Energy policy and regulations	32
2.4 Environmental policy and regulations	35
2.5 Development plans and strategies	39
3 Climate problem	41
3.1 Greenhouse gas emissions from Georgian forests	41
3.1.1 GHG Emission Profile	41
3.1.2 Future GHG emission projections.....	45
3.2 Climate change: risks and impacts.....	47
3.2.1 Observed trends of climatic variables	47
3.2.2 Projected changes in climatic variables	48
3.2.3 Climate-related hazards and trends	49
3.2.4 Climate risks and impacts on forest ecosystems	50
3.3 National climate goals and priorities	57
3.4 Summary of climate problem	59
4 Project target regions	61
4.1 Selection of project target regions	61
4.2 Selection of target districts within selected project regions	63
4.2.1 Overview of regions and target districts: Kakheti	67
4.2.2 Overview of regions and target districts: Mtskheta-Mtianeti	67
4.2.3 Overview of regions and target districts: Guria.....	68
5 Analysis of project baseline situation and barriers.....	69
5.1 Problem analysis: forest degradation as the main source of GHG emissions in the forest sector	69
5.1.1 Evidence of forest degradation	69
5.1.1.1 National Level	69

5.1.1.2	Target region level	74
5.1.2	Drivers of forest degradation	78
5.1.2.1	Wood removals: fuelwood harvesting and commercial timber	78
5.1.2.2	Overgrazing by livestock in forested areas	84
5.1.2.3	Pests and diseases	85
5.1.2.4	Forest fires	87
5.1.3	Root causes of forest degradation	88
5.1.3.1	High demand for fuel wood: baseline rural energy use.....	89
5.1.3.2	Demand for (commercial) timber	100
5.1.3.3	Inadequate forest management	104
5.1.3.4	Policy gaps and inefficiencies.....	112
5.2	Forest sector reform as a driver of change to combat forest degradation	118
5.2.1	Overview of process and status of reform	118
5.2.1.1	The National Forest Concept	118
5.2.1.2	National Forest Program (NFP).....	118
5.2.1.3	The European Union Association Agreement (AA)	120
5.2.1.4	New (Draft) Forest Code	120
5.2.2	Sustainable Forest Management (SFM) approach in Georgia	123
5.2.2.1	National Principles, criteria and indicators (C&I) for Sustainable Forest Management 125	
5.2.2.2	Management-level criteria and indicators for ecosystem-based forest management 126	
5.2.3	Changes the reform will bring to the forest sector	130
5.2.3.1	Policy.....	130
5.2.3.2	Forest Supervision	132
5.2.3.3	Forest Information and Monitoring System	137
5.2.3.4	Forest Management	142
5.2.3.5	Fuelwood and timber supply	163
5.2.4	Key challenges for implementation of the forest reform	167
5.2.4.1	Summary of barriers addressed by the reform and outstanding challenges	167
5.2.4.2	Financial baseline and barriers	172
5.3	Energy efficiency and alternative fuels: potential to reduce fuelwood consumption and avert forest degradation	176
5.3.1	Policy and regulatory environment for EE-AF sector development	177
5.3.2	Energy efficient technologies to reduce fuelwood consumption – status of market development.....	180
5.3.2.1	Energy efficient (EE) heating solutions for households	180
5.3.2.2	Thermal insulation of buildings: high potential and very early status of market development	182
5.3.2.3	Solar Water Heaters.....	183
5.3.2.4	Barriers to EE market development in rural Georgia.....	184
5.3.2.5	Conclusions	187
5.3.3	Alternative fuels to replace fuelwood – status of market development.....	188
5.3.3.1	Upgraded Solid Biofuels (USB): available alternatives and market status.....	188
5.3.3.2	Biomass availability and supply options for upgraded solid biofuels (USB)	192
5.3.3.3	Barriers to USB sector growth	196
5.3.4	Fuelwood saving potential in the target regions	198
5.4	Relevant past and ongoing donor support to both sectors	201
5.4.1	Technical assistance of GIZ	201
5.4.2	Technical assistance provided by other organizations	203

5.4.2.1	Forest Sector	203
5.4.2.2	EE-AF	213
6	Project design	216
6.1	Project objective	216
6.2	Project's approach to address barriers	222
6.3	The project's facility approach.....	231
6.3.1	Why a facility approach was selected.....	231
6.3.2	Georgia Forest and Energy Investment Facility (GFREIF)	232
6.4	Project structure and description	236
6.4.1	Component 1 Sustainable Forest Management	236
6.4.1.1	Activity 1.1 Development and implementation of sustainable forest management plans	237
6.4.1.2	Activity 1.2 Strengthening of forest supervision.....	250
6.4.1.3	Activity 1.3 Provision of sustainably produced fuelwood by NFA	254
6.4.1.4	Activity 1.4 Enhancement of enabling environment for the nation-wide implementation of sustainable forest management.....	257
6.4.1.5	Activity 1.5 Improvement of monitoring, and measurement, reporting and verification systems for the forest sector	268
6.4.2	Component 2 Market Development for Energy Efficiency (EE) and Alternative Fuels (AF).....	272
6.4.2.1	Activity 2.1 EE-AF supply chain development.....	273
6.4.2.2	Activity 2.2 Implementing consumer financing instruments for EE-AF solutions.....	279
6.4.2.3	Activity 2.3 Creating consumer awareness about EE-AF solutions and provision of technical advisory services for fuelwood users.....	284
6.4.2.4	Activity 2.4 Enabling policies and regulations.....	289
6.4.3	Component 3: Livelihood opportunities and local-self-governance in forest management	291
6.5	Synergies with other government initiatives	294
6.6	Project logical framework	295
6.7	Project budget and source of finance	311
7	Project implementation	314
7.1	Accredited Entity – Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)	314
7.2	Executing Entities.....	315
7.3	Other partners of the project	319
7.4	Contractual arrangements	320
7.5	Flow of Fund Structure	321
7.6	Financial management.....	322
7.7	Procurement	322
7.8	Governance Structure	323
7.8.1	Steering Committee:.....	323
7.8.2	Project Implementation Unit	324
7.9	Arrangements for Monitoring and Reporting	324
7.9.1	Recruitment of M&E staff.....	325
7.9.2	Independent monitoring and evaluation studies	325
7.10	Licenses, permits and other regulatory requirements	326
7.11	Knowledge management	326
8	Project justification and sustainability.....	331
8.1	Justification for GCF funding	331
8.1.1	Funding gap	331

8.1.1.1	SFM (Component 1)	331
8.1.1.2	EE-AF Sector (Component 2).....	333
8.1.2	Choice of instruments and concessionality	334
8.1.2.1	SFM (Component 1)	334
8.1.2.2	EE-AF Sector (Component 2).....	335
8.1.3	Cost-efficiency	336
8.2	Financial and economic assessment	336
8.2.1	Economic rate of return	336
8.2.2	Financial internal rate of return	337
8.3	Exit strategy and sustainability	338
8.3.1	SFM (Component 1).....	338
8.3.2	EE-AF Sector (Component 2)	339
8.3.3	Gender equality and environmental mainstreaming (cross-cutting)	340
8.4	Potential for scaling up and replication	341
9	Climate, environmental and sustainable development impacts and benefits	342
9.1	Carbon benefits.....	342
9.1.1	Sustainable Forest Management (SFM)	342
9.1.1.1	Reducing Forest Degradation under SFM in the project	343
9.1.1.2	Carbon Stock Enhancement under SFM in the project.....	347
9.1.2	Energy Efficiency and alternative fuels.....	356
9.2	Climate change adaptation benefits	362
9.3	Sustainable development benefits	364
9.3.1	Environmental benefits	364
9.3.2	Economic benefits	368
9.3.3	Social benefits.....	370
10	Stakeholder engagement.....	375
10.1	Stakeholder engagement during project design.....	375
10.2	Stakeholder engagement during project implementation	376
10.3	Environmental and social impact assessment	376
10.4	Gender	377
11	Project risks	380
	References.....	386
	Appendices (see separate document).....	392

LIST OF TABLES

Table 1: Land use matrix of Georgia in 2013-2015 (including Abkhazia and South Ossetia), thousand hectares	12
Table 2: Types of forests, areas and responsible authorities in Georgia in 2017	16
Table 3: Forest area of Georgia under the National Forestry Agency	17
Table 4: Responsibilities of main institutions for the Georgian forest and energy sectors	22
Table 5: Overview of forest legislation, policy and strategies	30
<i>Table 6: Key legislative and strategic documents in the area of energy efficiency.....</i>	<i>33</i>
Table 7: Overview of key environmental legislation, policy and strategies in Georgia	36
Table 8: Overview of national and regional development plans in Georgia.....	39
Table 9: Georgia's GHG emissions inventories.....	41
Table 10: Carbon stock changes and CO ₂ emissions/removals in LULUCF sector in 2010-2013	43
Table 11: Net GHG emission and absorption values from 2013-2014 LULUCF sector inventories using two approaches.....	45
Table 12: Past climate observations and future projections for project target regions.....	48
Table 13: NFA forest areas within the selected project regions	62
<i>Table 14: Quantitative GCF project area district selection framework</i>	<i>64</i>
Table 15: Overview of the project's target districts in Kakheti.....	67
<i>Table 16: Overview of the project's target district in Mtskheta-Mtianeti</i>	<i>67</i>
Table 17: Overview of the project's target districts in Guria	68
Table 18: Distribution of carbon stocks within different carbon pools for the forest formations in the project area	75
Table 19: Degradation classes (biomass %) after 20 years for beech.....	76
Table 20: The average difference between fuelwood consumption and the allocated resource according to the surveys.....	80
Table 21. Estimated current harvesting levels and sustainable yield levels in Georgia.....	81
Table 22: Legal timber and fuelwood harvesting in the 3 project regions from 2013-2017	82
Table 23: Number of livestock in the project target district Guria, Kakheti and Mtskheta- Mtianeti, in thousand heads.....	84
Table 24: Comparison of fuel supply alternatives for rural households	91
<i>Table 25: Estimates of active fuelwood users in Guria, Mtskheta-Mtianeti and Kakheti</i>	<i>96</i>
Table 26: Fuelwood demand in the project's target regions and districts	97
Table 27: Inputs, assumptions, calculated primary and final heat demand in three target regions	98
Table 28: Comparison of energy prices for households.....	100
Table 29. Overview of commercial timber demand and supply in Georgia.....	100
Table 30: Estimated annual cutting capacity of sawmills in the project regions	104

Table 31: Information on inventories and management plans for forestry districts in Guria, Mtskheta-Mtianeti and Kakheti.....	106
Table 32: Overview of NFA supported activities related to reforestation, restoration and afforestation in the project's target regions from 2015-2017	108
Table 33: Overview of NFA planned activities related to reforestation, restoration and afforestation in the project's target regions in 2019	108
Table 34: Overview of forest road infrastructure in project regions (new and rehabilitated forest roads) developed between 2015 and 2017	109
Table 35: Illegal forest use cases and incurred damage during 2013-2015.....	110
Table 36: Overview of criterion and indicators from the draft Management-level Criteria and Indicators for Ecosystem-based forest management*	128
Table 37: Overview of barriers, proposed measures and status	134
Table 38: High-tech and innovative equipment needs of DES.....	137
Table 39: Comparison of BAU practices with Proposed FIMS modules.....	139
Table 40: Overview of business as usual practices, improved practices for SFM and benefits of adopting improved practices.....	145
Table 41: Overview of information and assumptions used for the forest model.....	150
Table 42: Number of staff for specialized NFA teams within the eight target districts, and the cost for equipping each team	154
Table 43: Number of staff for specialized private sector contractor teams within the eight target districts, and the cost for equipping each team	156
Table 44: Comparison of BAU and SFM conditions in Georgia, benchmarking with SFM in EU countries**	158
Table 45: Potential harvest of category I, II, III and IV wood based on SFM under the forest model*	161
Table 46: Costs per BSY	166
Table 47: Barriers addressed by the forest sector reform and outstanding challenges and barriers.....	168
Table 48: Overview of DES budget for 2017, 2018 and 2019 (request).....	174
Table 49: Examples of insulation packages for rural houses in Tajikistan	183
<i>Table 50: Main types of fuel briquettes and methods for their production</i>	<i>190</i>
<i>Table 51: Specification of briquettes produced in Georgia</i>	<i>192</i>
Table 52: Availability of agricultural residues (fruit orchard, hazelnut, and vineyard) for alternative heat supply in target regions	194
Table 53: Total availability of raw materials for USB products in target regions	195
Table 54: Key assumptions used in fuelwood model.....	198
Table 55: Fuelwood saving potential from EE stoves	200
Table 56: Fuelwood saving potential in target regions.....	200
Table 57: Overview of barriers to transition to SFM and EE-AF sector development and the project's approach to address them	223

Table 58: Status of FMPs in target districts.....	237
Table 59: Planned training modules under sub-activity 1.1.1	240
Table 60: Examples of potential forestry measures (See Chapter 5.2 for more info)	241
Table 61: Planned training modules for sub-activity 1.1.2	244
Table 62: Planned training modules for sub-activity 1.2.1 and 1.2.2	250
Table 63: Equipment to be purchased under sub-activity 1.2.2	251
Table 64: Working groups under the upgraded NFP process	258
Table 65: Overview of FIMS modules and improvements to be made within the context of sub-activity 1.5.2.....	269
Table 66: Logical framework – fund-level impacts (Section E.3 of the Funding Proposal)	297
Table 67: Logical framework – fund-level outcomes (Section E.4 of the Funding Proposal)....	298
Table 68: Logical framework – project performance indicators (Section E.5 of the Funding Proposal).....	299
Table 69: Logical framework – activities (Section E.6 of the Funding Proposal)	304
Table 70: Activities under NFA oversight within the project	315
Table 71: Activities under DES oversight within the project.....	316
Table 72: Activities under EIEC oversight within the project.....	316
Table 73: Activities under ARDA oversight within the project.....	317
Table 74: Activities under GIZ oversight within the project.....	318
Table 75: Mitigation potential in the project from the reduction of degradation, over 20 years of project lifetime and 7 years of project implementation	346
Table 76: Mitigation potential in the project from the reduction of degradation, per main (dominant species) forest formation types	346
Table 77: Forest strata derived from the FMP datasets and up-scaled to the project area (columns with ** were derived from NFA data for the three target regions in order to upscale the FMP datasets)	349
Table 78: Age dependent stocking volume data per stand density group for beach; data derived from the FMP dataset.....	353
Table 79: Total results carbon stock enhancement as a result of SFM implementation in the project area.....	355
Table 80: Inputs to estimate GHG emissions reductions from EE and AF	358
Table 81: GHG emissions reductions from EE stoves and alternative fuels.....	359
Table 82: Direct GHG emission reduction from EE-AF sector	360
Table 83: Indirect (post-project) GHG emission reduction from EE-AF sector	360
Table 84: Examples of climate-resilient measures to be promoted through the project.....	362
Table 85: Summary of project environmental benefits and their contribution to the sustainable development goals (SDGs).....	365
Table 86: Summary of the economic benefits generated by the project, and their alignment with the sustainable development goals (SDGs)*	368

Table 87: Summary of the social benefits generated by the project, and their alignment with the sustainable development goals (SDGs)* 370

Table 88: Overview of project risks..... 380

LIST OF FIGURES

Figure 1: Geographic location of Georgia	1
Figure 2: Map of administrative regions and districts in Georgia.....	2
Figure 3: Population of regions and self-governed units*	3
Figure 4: Poverty head count by region in Georgia	4
Figure 5: Overview of key sectors and their contributions to Georgia’s GDP in 2017	5
Figure 6: Annual precipitation in Georgia, scale 1:200,000	8
Figure 7: Aridity index in Georgia, scale 1:200,000.....	8
Figure 8: Soil map of Georgia	9
Figure 9: Areas of Georgia with arid, semi-arid, semi-humid, and soils transitioning to semi-humid soils, at a scale of 1:200,000.....	10
Figure 10: Protected areas of Georgia	14
Figure 11: Overview of Emerald sites in Georgia.....	14
Figure 12: Forest area of Georgia managed by the National Forest Agency (green) and the Agency of Protected Areas (blue).....	16
Figure 13: Total Primary Energy Supply (TPES) by source, 1990-2016	19
Figure 14: Total Final Consumption (TFC) by source, 1990-2016	19
Figure 15: Final Energy Consumption by Georgia’s Residential Sector, 1990-2016, ktoe	20
Figure 16: Final Energy Consumption by Georgia’s Residential Sector by Source in 2016, ktoe	20
Figure 17: Overview of main institutions for project implementation	21
Figure 18: Forest regions of NFA.....	25
Figure 19: Regional DES offices	27
Figure 20: GHG emissions in Georgia by sector for 1990-2013	42
Figure 21: Land use and shares	43
Figure 22: Business as Usual (BAU) 2030 and Low Emissions Development (LEDS) 2030 scenarios.....	46
Figure 23: Trend in CO ₂ absorption by Georgian forests from 1990-2030	46
Figure 24: Georgia’s carbon flux as an effect of land use change.....	47
Figure 25: Regional distribution of hazard risks for certain hazards ranked as ‘high’ and ‘medium’ risk in Georgia (extreme heat, landslides, river floods, and wild fires) ..	50
Figure 26: Impact chain for the increased forest degradation due to climate change (West Georgia)	54
Figure 27: Impact chain for the increased forest degradation due to climate change (Central and East Georgia).....	54
Figure 28: GHG reduction targets of Georgia in the NDC	57
Figure 29: Map of target regions	62
Figure 30: Map of target districts.....	66
Figure 31: Overview of forest trends and characteristics from 1990-present.....	72

Figure 32: Annual increases and losses of timber in all forested areas of Georgia (1990 – 2015)	73
Figure 33: Degraded forest area near Borjomi as a result of illegal tree felling (left: 2007, right: 2015)	73
Figure 34: Example of forest degradation trend in Lanchkhuti, Guria (left photo 1999, right photo 2016)	74
Figure 35: Degradation assessment in Borjomi-Bakuriani forestry district from 1998-2014	76
Figure 36: Historic degradation 1998 - 2014 and projection under baseline scenario for predominant forest formations in the project's target districts (moderate scenario)	77
Figure 37: Volume (m ³) of legally felled timber in Georgia	78
Figure 38: Overall wood removals in Georgia in 2014 in million (M) cubic meters (m ³)	79
Figure 39: Volume (m ³) of legally felled timber in within the three target regions	82
Figure 40: Legal and illegal wood removals in Kakheti, Mtskheta-Mtianeti and Guria in 2017	83
Figure 41: Forest fires in Georgia 2003-2017	87
Figure 42: Overview of direct drivers, agents & key underlying causes of forest degradation in Georgia	88
Figure 43: Energy sources used for space heating	90
Figure 44: Conventional heat stoves	92
Figure 45: Top: Cooking on inefficient wood stoves. Bottom: Resources for space heating, water heating and cooking per household	94
Figure 46: Structure of dwelling by heating space	95
Figure 47: Energy efficiency class of a Georgian house	99
Figure 48: Interrelationship between license holders, sawmills, service providers and NFA	100
Figure 49: Overview of Electronic System of Timber Resources Management	103
Figure 50: Volume of illegal timber confiscated in the three project regions from 2011-2017	111
Figure 51: Procedures necessary for social felling of trees	113
Figure 52: Amount of the shortage and optimal volume of yearly extractable timber	114
Figure 53: Overview of commercial forestry licensing/ concession system	115
Figure 54: Impact of SFM on climate change adaptation and mitigation	125
Figure 55: Overview Georgia's FIMS Concept	141
Figure 56: Example of potential targeted ecosystem-based forest management interventions using an aerial photo from Lanchkhuti's FMP	144
Figure 57: Overview of planned activities	158
Figure 58: Overview of expected increase in standing volume (m ³), and the volume of timber and fuelwood produced annually (m ³)	161
Figure 59: Overview of wood (category I-III timber, and fuelwood) production potential over 7 years considering gradual implementation of SFM in the eight project districts	161

Figure 60: Overview of NFA’s concept for providing sustainably sourced timber and fuelwood	165
Figure 61: Potential BSY layout and overview of key infrastructure	165
Figure 62: Overview of barriers to SFM	167
Figure 63: Planned MoEPA budget for 2019 to 2022**NFA to.....	173
Figure 64: Overview of NFA budget sources (from state budget and NFA revenue) from 2015 to 2018	175
Figure 65: Examples of Svanuri pechi stoves	181
Figure 66: EE stoves available in Georgia.....	184
Figure 67: Awareness about energy efficiency among Georgian households	185
Figure 68: EE Stove Certificate by USAID Project.....	186
Figure 69: Price and fuelwood saving potential of EE alternatives.....	188
Figure 70: Use of hazelnut residues for heat supply.....	190
Figure 71: Fuelwood saving potential in the target regions: EE stoves only, m ³	201
Figure 72: Market development for EE stoves.....	216
Figure 73: Overview of fuelwood demand and supply from sustainably harvested forests in the three project regions (Guria, Mtskheta-Mtianeti, and Kakheti)	218
Figure 74: Carbon stocks in forests - paradigm shift.....	219
Figure 75: Theory of change.....	220
Figure 76: Complementarity of project objectives	221
Figure 77: Overview of Georgia Forest and Rural Energy Investment Facility.....	235
Figure 78: Project structure and inter-linkages.....	236
Figure 79: Overview of performance-based grant mechanism for NFA	249
Figure 80: Overview of upgraded NFP process	260
Figure 81: Overview of knowledge management and training platform: roles and responsibilities.....	264
Figure 82: Push & Pull Approach for Component 2	272
Figure 83: Technical Assistance and Investment Support Facility (TAISF)	274
Figure 84: Implementation and Fund Flow arrangement for Activity 2.2	283
Figure 85: Implementation and Fund Flow arrangement for Activity 2.3.1	287
Figure 86: Implementation and Fund Flow arrangement for Activity 2.3.2	288
Figure 87: Synergies between the GCF project and government initiatives.....	294
Figure 88: Overview of contractual arrangements	321
Figure 89: Flow of funds.....	322
Figure 90: Governance and implementation structure	323
Figure 91: Mitigation concepts in the project as a result of the SFM introduction	342
Figure 92: Mitigation potential in the project after 7 and 20 years for reducing forest degradation and enhancement of carbon stocks as a result of SFM implementation	343

Figure 93: Historic degradation 1998 - 2014 and projection under baseline and SFM scenario 344

Figure 94: Calibration of the Tool 345

Figure 95: Entry of Tier 2 values (in green) for beach forest carbon stocks and degradation classes 345

Figure 96: Specifying degradation levels in the baseline and the project and entry of the specific forest formation area in the project..... 345

Figure 97: Established Chapman-Richards biomass density growth models for Beech 353

Figure 98: Total projected carbon stock changes in the baseline and the project scenarios as a result of SFM implementation (tCO₂eq) 354

LIST OF INFO BOXES

Info Box 1: The role of Georgia’s forest sector in the national economy	5
Info Box 2: Forest definition of Georgia	15
Info Box 3: Legal Entity of Public Law	23
Info Box 4: Key regulations for forest management	31
Info Box 5: Responding to climate risk and vulnerability in forest ecosystems in Adjara	55
Info Box 6: Implications for the project design	55
Info Box 7: Definitions of forest degradation	69
Info Box 8: Social situation	96
Info Box 9: Degradation in concession areas	101
Info Box 10: Sawmills as a hotspot for illegality	102
Info Box 11: Recent processes to support new FMP development and implement a National Forest Inventory	105
Info Box 12: Evaluation of the National Forest Program	119
Info Box 13: Climate benefits of SFM	124
Info Box 14: NTFP regulations and opportunities	131
Info Box 15: Low / Reduced Impact logging	149
Info Box 16: University and vocational education and training	154
Info Box 17: GIZ’s Support on Vocational Education and Training in Georgia	155
Info Box 18: Potential to strengthen the emerald network through project interventions	163
Info Box 19: EU Ecodesign Directive	178
Info Box 20: National Accreditation Body	179
Info Box 21: Energy Efficient Public Procurement	179
Info Box 22: Annual crops	196

LIST OF ABBREVIATIONS

AA	The European Union Association Agreement
AAC	Annual allowable cut
AE	Accredited Entity
AF	Alternative Fuels
AGB	Above ground biomass
AMA	Accreditation Master Agreement
APA	Agency of Protected Areas
APMA	Agriculture Project Management Agency
AR	Autonomous Republic
AR4	Fourth Assessment Report of the United Nations Intergovernmental Panel on Climate Change
AR5	Fifth Assessment Report of the United Nations Intergovernmental Panel on Climate Change
ARDA	Agricultural and Rural Development Agency
BAU	Business as Usual
BC	Black carbon emissions
BMZ	Federal Ministry of Economic Cooperation and Development (Germany)
BSY	Business Service Yard
BUR	First Biennial Update Report
C&I	Criteria and Indicators
CBD	United Nations Convention on Biological Diversity
CBO	Community-based organization
CO	Carbon monoxide
CSO	Civil society organizations
DBMS	Database management system
DCFTA	Deep and Comprehensive Free Trade Area
DES	Department of Environmental Supervision
DHW	Domestic hot water
DSM	Demand-side management
EBRD	European Bank for Reconstruction and Development
EcoServe	Management of Natural Resources and Safeguarding of Ecosystem Services for Sustainable Rural Development in the South Caucasus (GIZ regional project)
EE	Energy Efficiency
EEA	Energy Efficiency Agency
EE-AF	Energy efficiency and alternative fuels
EED	Energy Efficiency Directive
EEPP	Energy Efficient Public Procurement
EE-RE	Energy efficiency and renewable energy

EIEC	Environmental Information and Education Centre
EIRR	Economic internal rate of return
ENPI	European Neighborhood and Partnership Instrument
EPB	Energy Performance of Buildings
EPBD	Energy Performance of Building Directive
ESIA	Environmental and social impact assessment
ESMP	Environmental and social management plan
ESRI	Environmental Systems Research Institute
EU	European Union
EX-ACT	EX-Ante Carbon Balance Tool
FAA	Funded Activity Agreement
FDI	Foreign direct investment
FIMS	Forest information and monitoring system
FIPM-WG	Forest Inventory Planning and Monitoring Working Group
FIRR	Financial IRR (internal rate of return)
FITF	Forest Inventory Task Force
FLEG	Forest Law and Enforcement Governance
FLUIDS	National Forest and Land Use Information and Decision Support
FMI	Forest Management Inventories
FMP	Forest Management Plan
FMU	Forest management unit
FNC	First National Communication
FS	Feasibility study
FSC	Forest Stewardship Council
GAC	Georgian Accreditation Center
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GFREIF	Georgia Forest and Rural Energy Investment Facility
GFW	Global Forest Watch
GHG	Greenhouse Gas
GIZ	German development agency
GPS	Global positioning system
GSM	Global system for mobile communications
GWB	German Act against Restraints of Competition
HH	Households
IBiS	Integrated Biodiversity Management South Caucasus (GIZ regional project)
IFAD	International Fund for Agricultural Development
IPCC	Intergovernmental Panel on Climate Change

IRR	Internal rate of return
KfW	German state-owned development bank
KMTP	Knowledge management and training platform
LEDS	Low Emission Development Strategy
LEPL	Legal Entity of Public Law
LIP	Local information point
LPG	Liquefied petroleum gas
LULUCF	Land Use, Land Use Change and Forests
M&E	Monitoring and Evaluation
MFI	Micro-finance institution
MoENRP	Ministry of Environment and Natural Resources (former MoEPA)
MoEPA	Ministry of Environment Protection and Agriculture
MoESD	Ministry of Economy and Sustainable Development
MoF	Ministry of Finance
MoU	Memorandum of Understanding
MRV	Measurement, Reporting and Verification
MTR	Mid-term review
NAMA	Nationally Appropriate Mitigation Actions
NAP	National Adaptation Plan
NCV	Net caloric value
NDC	Nationally Determined Contribution
NEAP	National Environmental Action Programme
NEEAP	National Energy Efficiency Action Plan
NFA	National Forestry Agency
NFI	National Forest Inventory
NFP	National Forest Program
NGO	Non-governmental organization
NREAP	National Renewable Energy Action Plan
NTFP	Non-timber forest products
O&M	Operation and maintenance
PM	Particulate Matter
PR	Public relations
RE	Renewable Energy
REDD+	Reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries
RIL	Reduced impact logging
SCFF	State Commercial Forest Fund
SDG	Sustainable Development Goal

SEC	Specific energy consumption
SEFF	Sustainable Energy Financing Facility
SFF	State Forest Fund
SFM	Sustainable Forest Management
SIDA	Swedish International Development Cooperation
SME	Small medium enterprise?
SNC	Second National Communication to UNFCCC
SOP	Standard operating procedure
SWH	Solar water heating
TA	Technical assistance
TAISF	Technical Assistance and Investment Support Facility
TEEB	The Economics of Ecosystems and Biodiversity
TFC	Total final consumption
TNC	Third National Communication to UNFCCC
TPES	Total Primary Energy Supply
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Program
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
USB	Upgraded solid biofuels
VgV	German Regulation on the Award of Public Contracts
VOB and UVgO	Contracting Rules for the Award of Construction Services (Germany)
WB	World Bank
WG	Working group
WHO	World Health Organization
WWF	World Wildlife Fund

UNITS

m.a.s.l	Meters above sea level
cm	Centimeter
CO ₂	Carbon dioxide
CO ₂ eq	Carbon dioxide equivalent
EUR	Euro
GEL	Georgian Lari
Gg	Gigaton
ha	Hectare
kWh	Kilowatt hour
ktoe	Kiloton of Oil Equivalent
m	Meter
m ³	Cubic meter
PM _{2.5}	Atmospheric particulate matter (PM) that have a diameter of less than 2.5 micrometers
t	Metric ton
USD	United States Dollar

OTHER NOTES AND CONSIDERATIONS

The term ‘Appendix’ refers to the appendices used for the Feasibility Study (see end of this document), whereas the term ‘Annex’ is used to refer to the Annexes for the Funding Proposal.

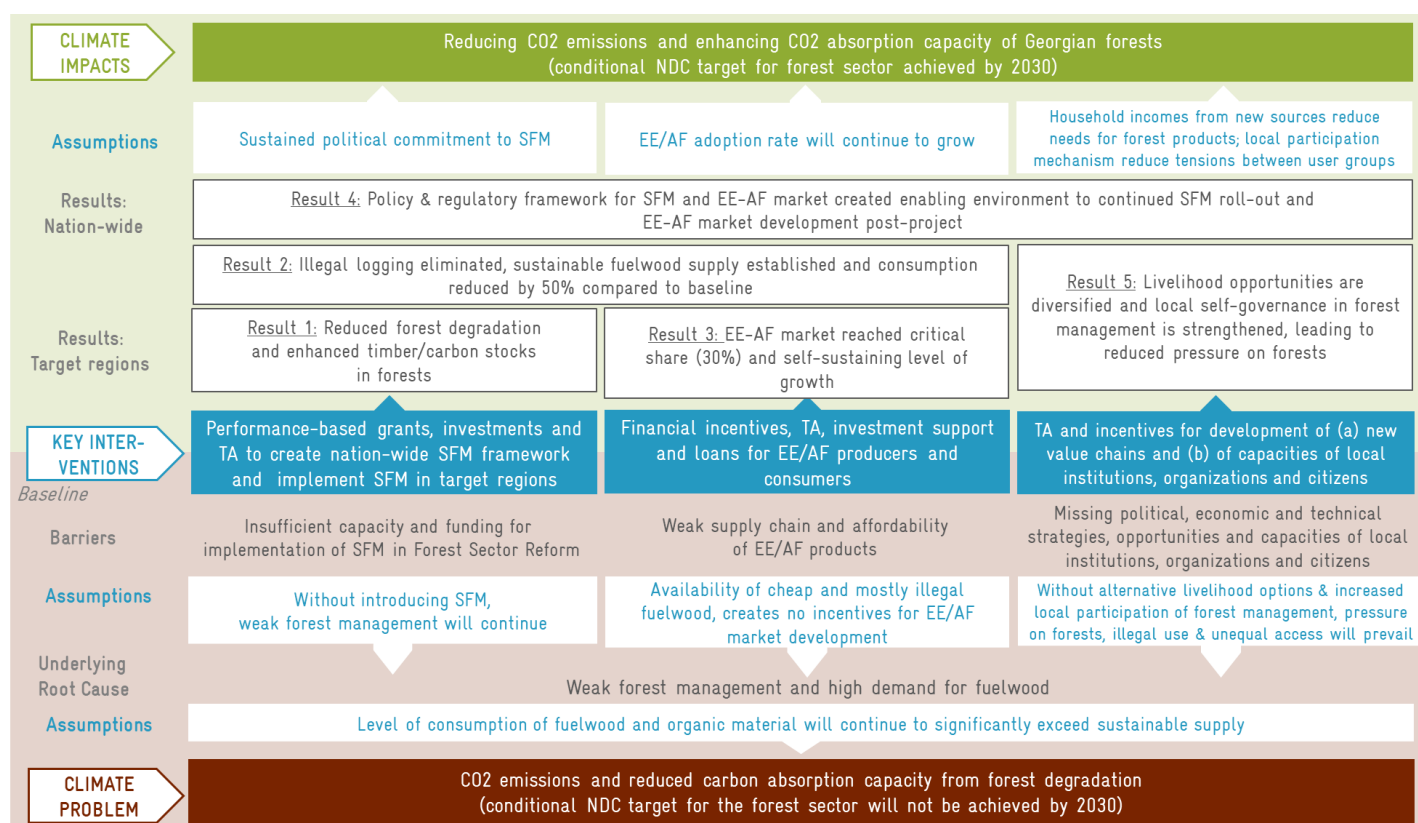
EXECUTIVE SUMMARY

Georgia's forests play a pivotal role in securing net removal of GHG emissions, which are expected to rise by 70 % to 28,690 Gg CO₂eq in 2030 in the BAU scenarios. However, LULUCF sector absorption capacity is rapidly decreasing. Climate change impacts and the demand for fuelwood from rural population puts significant pressure on Georgia's forests: up to 90% of rural households (1.43 million people) rely on fuel wood for their energy needs. This leads to forest degradation and loss of carbon absorption capacity, which is projected to decrease by five times between 1990 and 2030.

There is a need to promote the transition to SFM, in particular ecosystem-based forest management, nationally, while simultaneously promoting the adoption of energy efficient technologies and alternative fuels to reduce the rural population's reliance on fuelwood. Such practices will reduce forest degradation and enhance forest carbon stocks, strengthening the sink potential of Georgia's forests to regulate net GHG emissions. It further can generate numerous sustainable development benefits. The Government of Georgia therefore prioritized the forest sector in its Nationally Determined Contribution (NDC) aiming at reducing GHG emissions by 6 million tCO₂eq by introducing the sustainable forest management (SFM) on 250,000 ha of state-managed forest lands over a period of 2020-2030.¹

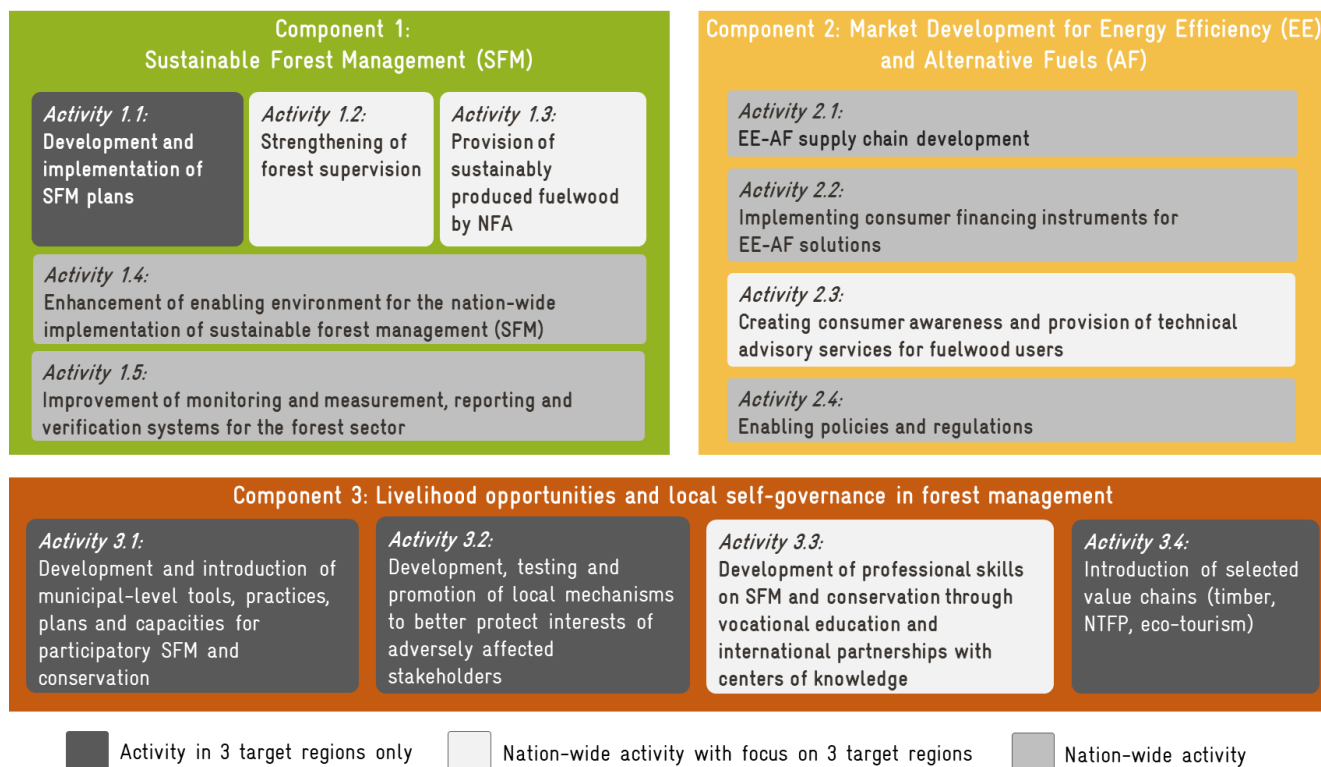
The project will enable the Government of Georgia to implement its transformational forest sector reform agenda to put the entire nation's forests under the SFM framework. It will do so by supporting establishment of a nation-wide SFM system under Component 1 and in parallel, under Component 2, promoting market development for energy efficient (EE) and alternative fuels (AF) to address main driver of Georgia's forest degradation, the unsustainable fuelwood consumption by rural population. Component 3, addressing potential adverse effects of the forest sector reform, safeguards the reform implementation by diversifying livelihood opportunities and strengthening local self-governance in forest adjoining rural communities (see Theory of Change below).

¹ Conditional commitment.



Project theory of change

The following Figure depicts the project structure with the three project components.



Project structure

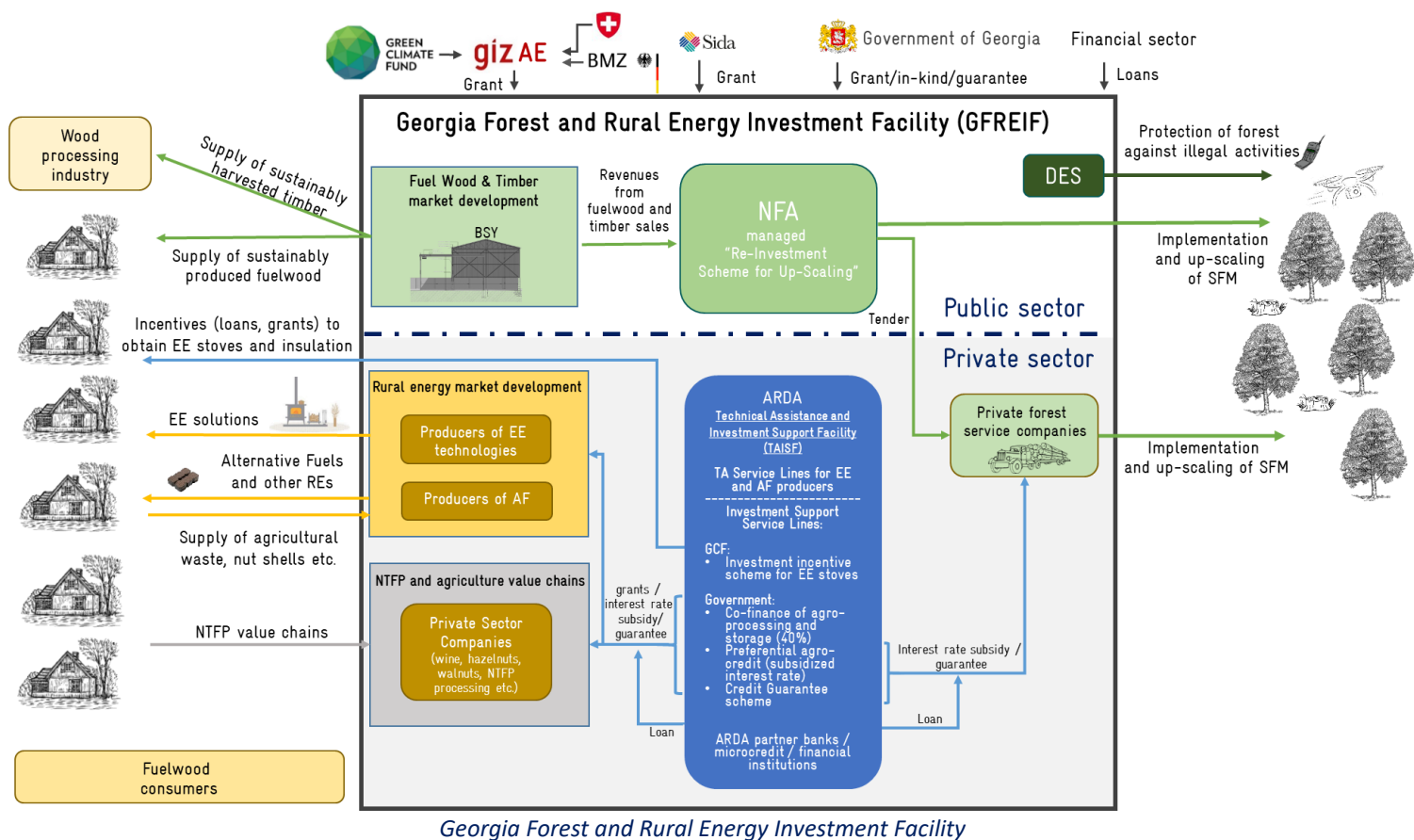
The first component will help the Government put in place main building blocks of SFM at national level in the form of appropriate policy and regulatory environment, knowledge and data, as well as human and institutional capacities. At the regional level, the project will implement SFM in the three target regions of Kakheti, Mtskheta-Mtianeti and Guria. By doing so, the project will help develop an appropriate institutional structure and a business model for SFM, which will then be replicated to cover all forest areas in the country. Under second component, the project will accelerate growth of the nascent EE-AF sector in Georgia by pushing the development of supply chain and in parallel pulling the demand via consumer awareness raising, provision of financial incentives and consumer financing products in partnership with financial institutions, as well as creating conducive policy and regulatory framework for the sector in line with *EU acquis*, which the Government of Georgia has committed to implement.

The project will cover 270,807 ha of state-managed forests in the target regions with SFM (over-achieving the NDC target of 250,000 ha).² This will lead to the improvement of quantitative and qualitative characteristics of the forests and gradual build-up of carbon stock: Broader SFM implementation will lead to a reduction of forest degradation in the range of 0.8 t biomass per ha and year (1.3 tCO₂/ha/year); in addition forest biomass will increase by 1.7 t biomass per ha and year (2.9 tCO₂/ha/year) as a result of direct SFM measures. Further, availability of sustainably harvested fuelwood in the regions will increase 5-fold from 50,000 m³ up to 285,575 m³ by the project end. In addition, the Project will promote accelerated deployment of EE stoves and AF in the target regions to ensure up to 30% penetration by project end and up to 75% in the long-run. This will significantly diminish pressure on forest resources and demand for fuelwood from 100,000 rural households, i.e. by up to 360,000 m³ or 50% compared to baseline. Taken together, SFM and EE-AF adoption will make sure that supply of sustainably harvested biomass in the target regions can meet the demand thus effectively reducing the fuelwood gap, which currently stands at 580,000 m³.

Tackling both, the underlying driver of the degradation by making fuelwood use more efficient and by improving the management of the undervalued forest resource, will translate in a direct climate impact: unsustainable biomass extraction will be reduced on one hand and on the other incremental growth in the more resilient forest will increase. The amount of CO₂eq remaining sequestered in standing forest will increase thereby reducing GHG emissions from forest degradation and enhancing carbon stock by at least 5.30 million tCO₂eq by the project end at a cost to the GCF of EUR 6.81/tCO₂eq and 16.14 million tCO₂eq over a 20-year project lifetime at a cost to the GCF of EUR 2.0/tCO₂eq.

The project will also bring about important social, environmental and health benefits. It will directly benefit close to 100,000 rural residents, fuelwood users, by enabling investment in energy efficiency and alternative fuels and, as a result, will lower energy poverty, improve thermal comfort and the quality of indoor and outdoor environment by reducing NOx and particles emissions from fuelwood combustion by inefficient heat stoves.

² Note on the project area: The total forest area within the selected forest districts is 293,824 ha. The area analyzed in terms of forest degradation and mitigation impacts amounts to 270,807 ha. The area difference is due to the fact that some areas could not be attributed to a specific forest formation for which information on carbon stocks is available. See Feasibility Study Chapter 4 for more detail.



To scale-up public and private investment in low-carbon transformation of Georgia's forestry and rural energy sector, the project will set-up, as an overarching financing framework, the Georgia Forest and Rural Energy Investment Facility (GFREIF) – see Figure above. Via GFREIF, the project will mobilize significant co-finance from the government, the financial sector and donors at the ratio of 1:2 (GCF – confirmed co-finance). The GCF grant, by filling selected funding gaps while minimizing concessionality, will be crucial to the successful execution of the project. In addition, it will leverage a considerable public and private sector contribution – EUR 184.71 million – from the households, EE-AF suppliers, forest private sector contractors, National Forestry Agency and financial sector. The project's cumulative total finance leveraged ratio is therefore 1:6 (GCF – total leverage).

1 COUNTRY AND SECTOR PROFILES

1.1 Country profile

Located in the central and western part of the South Caucasus, Georgia shares borders with the Russian Federation to the north, Azerbaijan to the east, Armenia to the south east and Turkey in the southwest (Figure 1).



Figure 1: Geographic location of Georgia

Source: Global Forest Watch, no date (N.D.).³

In terms of administrative divisions, the country is divided into 9 administrative regions, 1 city (Tbilisi), and 2 autonomous republics (Abkhazia⁴ and Adjara; Figure 2). Below the regional level there are 67 administrative districts.

³ Online maps available [here](#).

⁴ The Autonomous Region of Abkhazia is a breakaway region occupied by separatist forces.

Since the collapse of the Soviet Union, the population has been in decline. From 1993 to 2017 the population declined by over 1.2 million people, primarily due to emigration and to a lesser extent the country's changing age structure (reduced birth rate and aging population; Figure 3).

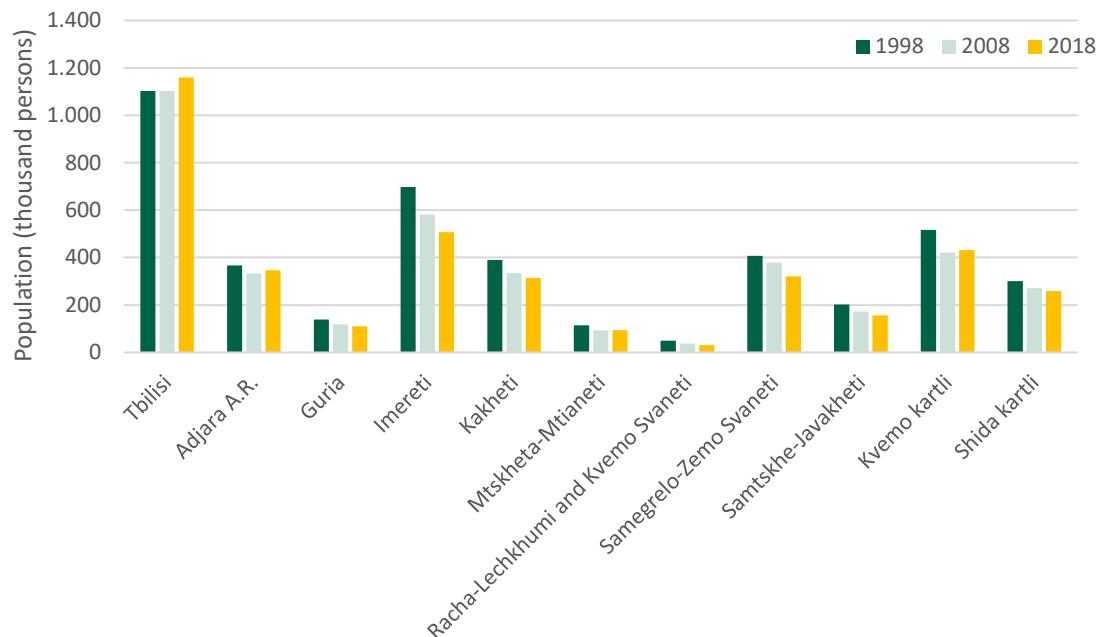


Figure 3: Population of regions and self-governed units*

*Note: Abkhazia Autonomous Republic is not included.

Source: GEOSTAT 2019d

Employment, poverty and inequality in Georgia

In total 52% of the population is considered economically active.¹³ The average household has an income of USD \$417.29 per month (GEL 1,110.70).¹⁴ Majority of the economically active population is employed in agriculture, hunting, forestry and fishing (43%), followed by wholesale and retail trade, repair of motor vehicles and personal and household goods (10%), health and social work (9%), and industry (8%), among other economic activities.¹⁵ The country's unemployment has declined from 15.1% in 2005 to 12.7% in 2018.¹⁶

Georgia has a human development index (HDI) of 0.78, ranking 70th globally.¹⁷ Major strides have been made in reducing poverty, where the number of people living in poverty declined from 38.8% in 2007 to 21.9% in 2017.¹⁸ However, the number of people living in poverty and extreme poverty in Georgia is higher than in other countries in Europe and Central Asia.¹⁹ Also nearly half of the poor population is considered as "vulnerable to falling into poverty".²⁰ Georgia has a Gini-

¹³ GEOSTAT 2019e.

¹⁴ Ibid.

¹⁵ GEOSTAT 2019f.

¹⁶ Ibid.

¹⁷ UNDP 2019.

¹⁸ Absolute poverty line of USD \$2.50/day; UNDP 2019; GEOSTAT 2019a.

¹⁹ Garforth et al. 2016; World Bank 2019.

²⁰ World Bank 2018a.

coefficient of 36.5 in 2016, with inequality levels slightly lower than Turkey and Russia, and higher than Armenia and Azerbaijan.²¹

People in rural areas are more likely to be affected by poverty than people living in urban areas in the country, with rural and urban poverty rates of 24.3% and 17.6%, respectively (Figure 4).²² In terms of income, rural households in Georgia earn the equivalent of 80% of the average salary earned by urban households.²³ The gap between urban and rural poverty has remained relatively stable over the last decade.²⁴ Rural economic growth rates are much lower compared to urban areas, especially in Kakheti, Mtskheta-Mtianeti and Shida Kartli.²⁵ Reasons for lower production is limited access to markets, education, fragmentation of land and underdeveloped infrastructure.²⁶ In terms of education, the majority (78%) of the population with higher education is from urban areas, indicating a lower level of education in rural settlements.²⁷ Rural households headed by women with children are particularly vulnerable to poverty.²⁸

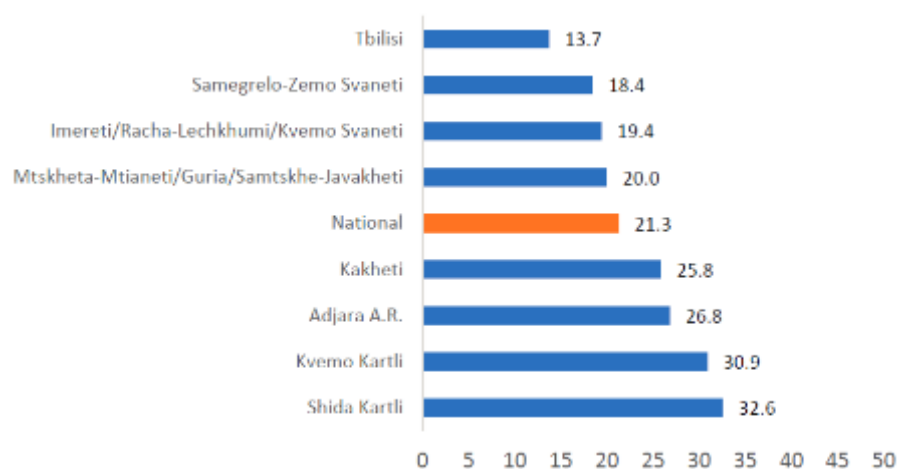


Figure 4: Poverty head count by region in Georgia

Source: World Bank 2018a based on 2016 GEOSTAT data, p. 7

1.2.2 Economy and governmental debt

Macroeconomic information (GDP, GDP of key sectors, GDP per capita)

The annual Gross Domestic Product (GDP) of Georgia currently exceeds USD \$15.08 billion. It fell sharply after the independence of the Soviet Union but has been gaining strength since the early 2000s.²⁹ The GDP per capita in 2018 was USD \$4,344 (GEL 12,915) making Georgia a lower middle-income country.³⁰ Supported by external demand and buoyant consumption, real GDP grew 5% in 2017.³¹ Annual inflation reached 6.7% at the end of 2017, and fell to 2.5% in April

²¹ World Bank 2018a.

²² IMF 2018a.

²³ Ibid.

²⁴ World Bank 2018a.

²⁵ IMF 2018a.

²⁶ Gassmann et al. 2013.

²⁷ GEOSTAT 2016.

²⁸ GEOSTAT 2018.

²⁹ World Bank 2019.

³⁰ World Bank 2019.

³¹ IMF 2018a.

2018 as the impact of one-off shocks (increase in excise taxes, surge in oil prices, and depreciation of nominal effective exchange rate) dissipated.³² Supported by revenue measures, the strengthened recovery, and the reduction in current spending, the fiscal position in 2017 remained stable while allowing a considerable ramp up in public investment.³³ Rapid growth in exports, tourism, and remittances narrowed the current account deficit to 8.7% of GDP.³⁴ Foreign direct investment (FDI) reached 10.5% of GDP in 2017.³⁵ Key sectors within the Georgian economy include: trade, repair of motor vehicles, and personal household goods (17.1%); manufacturing (10.5%); construction (9.1%); agriculture, forestry, hunting and fishing (8%); transport (7.8%); real estate, renting and business activities (7%); among others (Figure 5).³⁶

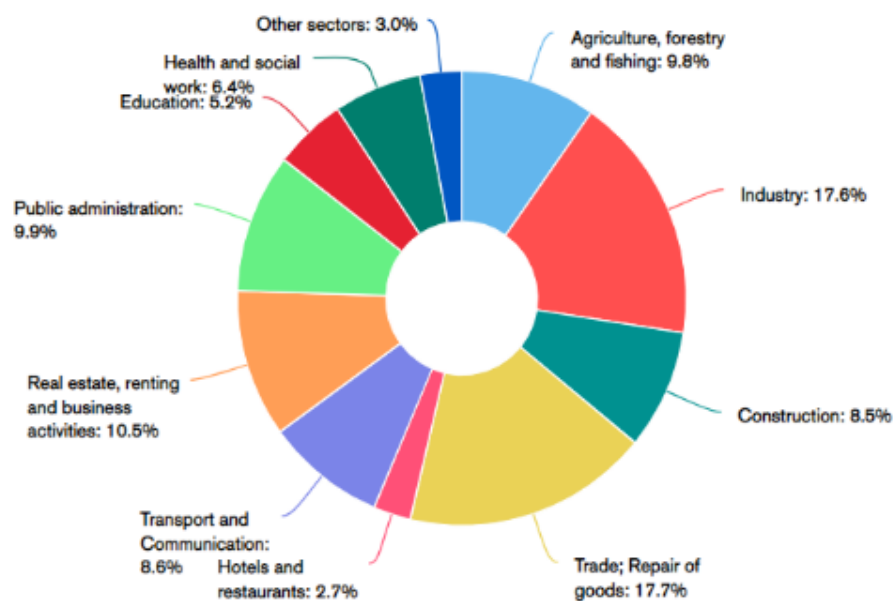


Figure 5: Overview of key sectors and their contributions to Georgia's GDP in 2017

Source: Georgian National Investment Agency, No Date

Info Box 1: The role of Georgia's forest sector in the national economy³⁷

The forest sector comprises only a small part of the Georgian economy. In 2014, contribution from legal cuts, transportation and processing of timber to Georgia's GDP amounted only 0.3% of GDP.³⁸

Majority of the timber industry (90%) is comprised of small enterprises. Over the past two decades, the number of people directly employed in the forestry sector has declined from about 3,500 in 1995 to only 900 in 2017. Nonetheless, illegal use of forest resources is high in Georgia, and official statistics do not capture the full use of forest resources (see Chapter 5.1 for more detailed information).

³² National Bank of Georgia 2018.

³³ Ibid.

³⁴ Ibid.

³⁵ IMF 2018a.

³⁶ Georgian National Investment Agency [No Date].

³⁷ All information within this info box has been adapted from Garforth et al. 2016, unless otherwise cited.

³⁸ National Principles, Criteria and Indicators for Sustainable Forest Management Georgia (Draft Document 8. November 2017).

National debt and credit context

External debt, mostly concessional, remains elevated, at 96% of GDP in 2017, excluding inter-company loans.³⁹ In March 2018, credit to the private sector (at constant exchange rates) grew by 20%, driven by credit to households, particularly mortgage lending.⁴⁰ Consumer lending continued to grow in 2017, and household debt reached 34% of GDP by the end of 2017. Although starting from a low base, household debt has doubled in the last five years.⁴¹

Due to large macroeconomic shocks like exchange rate depreciation, the country's economic status remains vulnerable. However, stability is improved through increasing reserves and export competitiveness, developing domestic capital markets and attracting foreign investment.⁴²

The current macroeconomic environment offers Georgia an opportunity to advance reforms to increase resilience to external shocks and to promote higher and more inclusive growth, while aiming to preserve macroeconomic stability. Government authorities are committed to fiscal sustainability, which—in the context of limited room to raise extra revenue—will be achieved by containing current spending while creating room for higher public investments.

However, in terms of availability and access to public/ international finance to support investments in mounting social and infrastructure needs, Georgia still faces a number of challenges. Government revenues experience strong fluctuations and have decreased by 30% to GEL 693 million in the first quarter of 2018 (compared to the 4th quarter of 2017). Public debt (45% of GDP) has breached the government's own policy target, and current account deficits prove to be historically high (currently 9.4% of GDP).⁴³ In terms of international markets, under Moody's Baa2 ranking, Georgia's credit risk of fixed income obligations was considered to have speculative elements and moderate credit risk, which clearly limits future uptake of international re-financing (loans, etc.).

1.3 Environment profile

Topography

Georgia's surface area comprises 69,709 square kilometers.⁴⁴ Located in the South Caucasus region, Georgia has varied topography and diverse environmental conditions. To the west of the country, it is bordered by the Black Sea with a 310 km coastline.⁴⁵ To the north it is bordered by the Greater Caucasus Mountain Range, and to the southwest by the Lesser Caucasus Mountain Range. The Greater and Lesser Caucasus Mountain Ranges are connected by the Likhi Range, which runs through central Georgia.

In total, 54% of the territory is classified as mountainous, 33% foothills and 13% lowland terrain.⁴⁶ It includes diverse landscapes including foothill and mountain forests, sub-alpine mead-

³⁹ IMF 2018a.

⁴⁰ Ibid.

⁴¹ Ibid.

⁴² Ibid.

⁴³ World Bank 2019.

⁴⁴ GEOSTAT 2017; Total land area of 69,494 km² excluding inland bodies of water

⁴⁵ MoENRP 2016

⁴⁶ Urudshadze and Ghambashidze 2013

ows along the Greater and Lesser Caucasus Mountain Ranges, treeless mountain upland plateaus of the Lesser Caucasus Mountain Range, humid low-land forests of Western Georgia and arid-steppe and deserts of Eastern Georgia.⁴⁷

Climate

Located at the crossroads of Western Asia and Eastern Europe, Georgia's encompasses a variety of climatic conditions. Weather patterns in the country are influenced by dry Caspian air masses from the east, and humid Black sea air masses from the west.⁴⁸ In addition, the Greater Caucasus Range in Northern Georgia protects against cold air masses from the north.⁴⁹

The mean annual temperature in West Georgia is 14-15°C and 11-13°C in East Georgia;⁵⁰ and mean annual precipitation is 1,338 mm – however it should be noted that there is substantial variation due to the diversity of climatic zones and conditions in the country with dry steppes with under 400 mm of precipitation and other humid areas with over 4,000 mm per year (Figure 6).

Western Georgia has a humid-subtropical maritime climate. The region's climate is characterized by a mild climate with average maximum temperatures of around 10-13°C in winter and 20-26°C in summer.⁵¹ It experiences the highest rainfall within the country, experiencing 1,000-2,500 mm of precipitation per year.⁵² Central and Eastern Georgia experience a more continental climate, where precipitation and humidity decline as you go further East from the Black Sea (Figure 7). Average maximum temperatures in Eastern Georgia reach on average 25-31°C in summer and averages of 5-8°C during the winter.⁵³ Southeast Georgia is the driest area of the country, with average annual precipitation within the range of 500-800 mm per year.⁵⁴

⁴⁷ Kobakhidze 2015.

⁴⁸ MoENRP 2016.

⁴⁹ Ibid.

⁵⁰ MoENRP 2015.

⁵¹ <https://www.climatestotravel.com/climate/georgia>

⁵² Dolidze et al. 2012 in MoENRP 2014a.

⁵³ <https://www.climatestotravel.com/climate/georgia>

⁵⁴ Dolidze et al. 2012 in MoENRP 2014a.

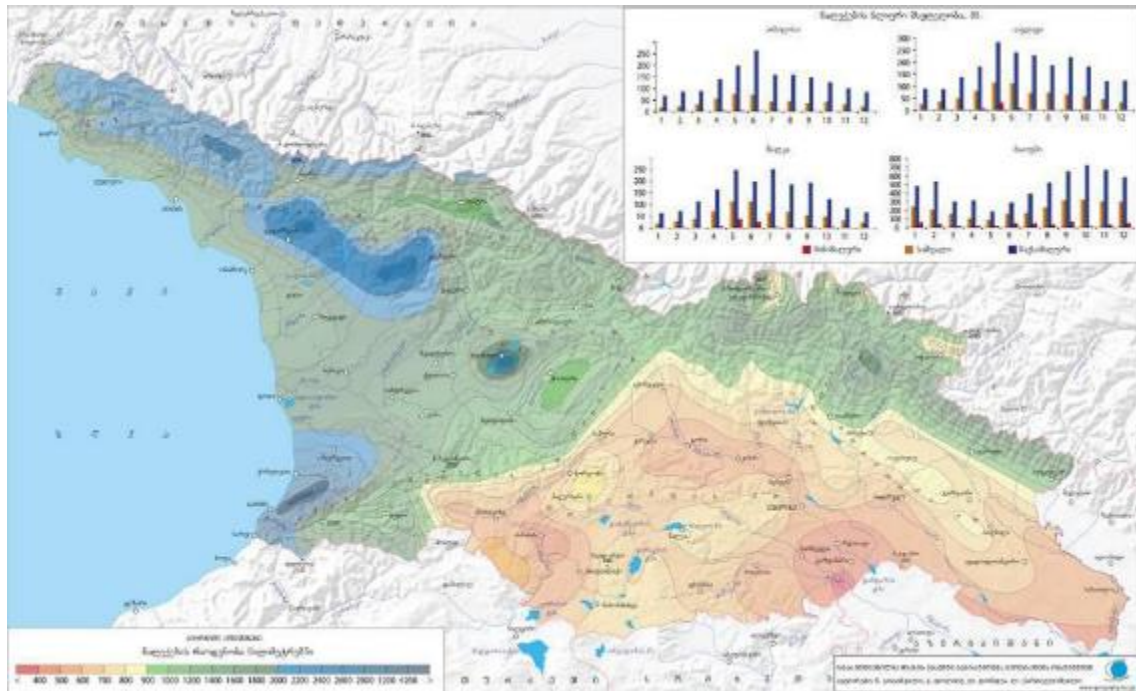


Figure 6: Annual precipitation in Georgia, scale 1:200,000

Source: Dolidze et al. 2012 in MoENRP 2014a, p. 42

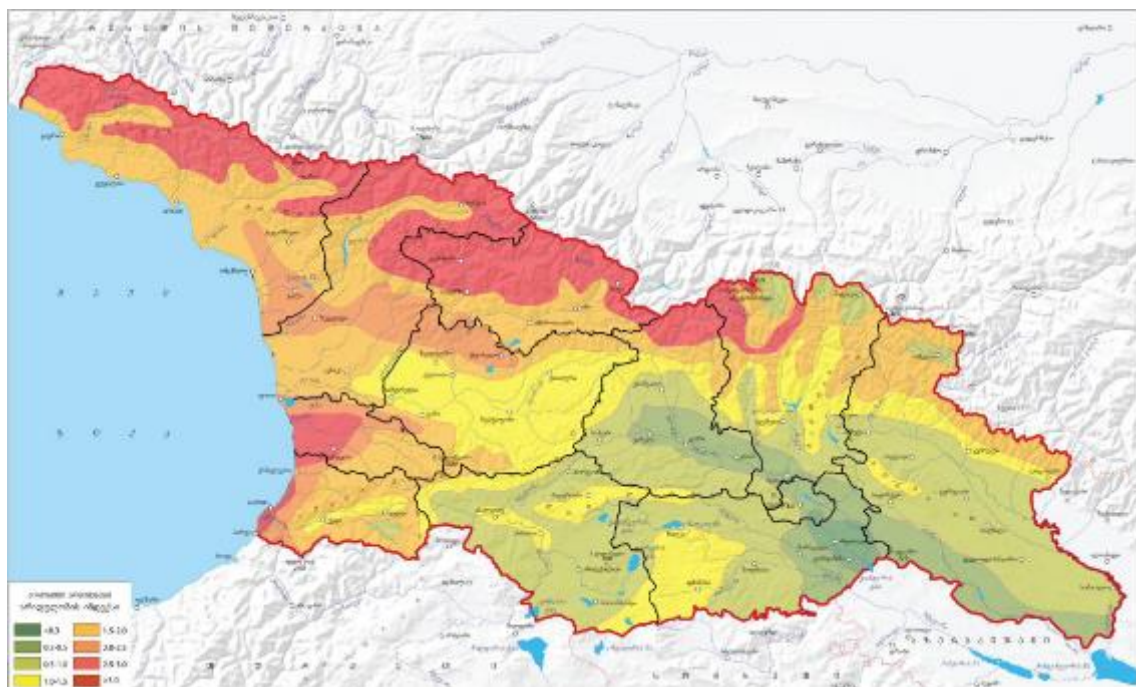


Figure 7: Aridity index in Georgia, scale 1:200,000

Source: Gogichaishvili 2012 in MoENRP 2014a, p. 44

Water resources

In terms of freshwater, there are over 26,000 streams in Georgia, 860 lakes and 734 glaciers in the country.⁵⁵ Major rivers in Georgia include the Alazani River, Mtkvari, Rioni, Enguri, Khrami, Tskhenistsqali, Iori and Qvirila rivers, among others. Rivers and streams located in Western Georgia primarily drain into the Black Sea, whereas rivers in the Eastern part of the country primarily drain into the Caspian Sea through neighboring countries.

Soils

Various soil types are present due to the diverse bio-geophysical conditions in the country (see Figure 8). There are 17 main soil types in Georgia.⁵⁶ The most dominant soil types include mountain-meadow soils (Leptosols, covering 25% of the territory), brown forest soils (Cambisols Eutric, covering 18% of the territory), and cinnamonic soils (Cambisols Cromic, covering 8% of the territory - primarily in Eastern Georgia).⁵⁷

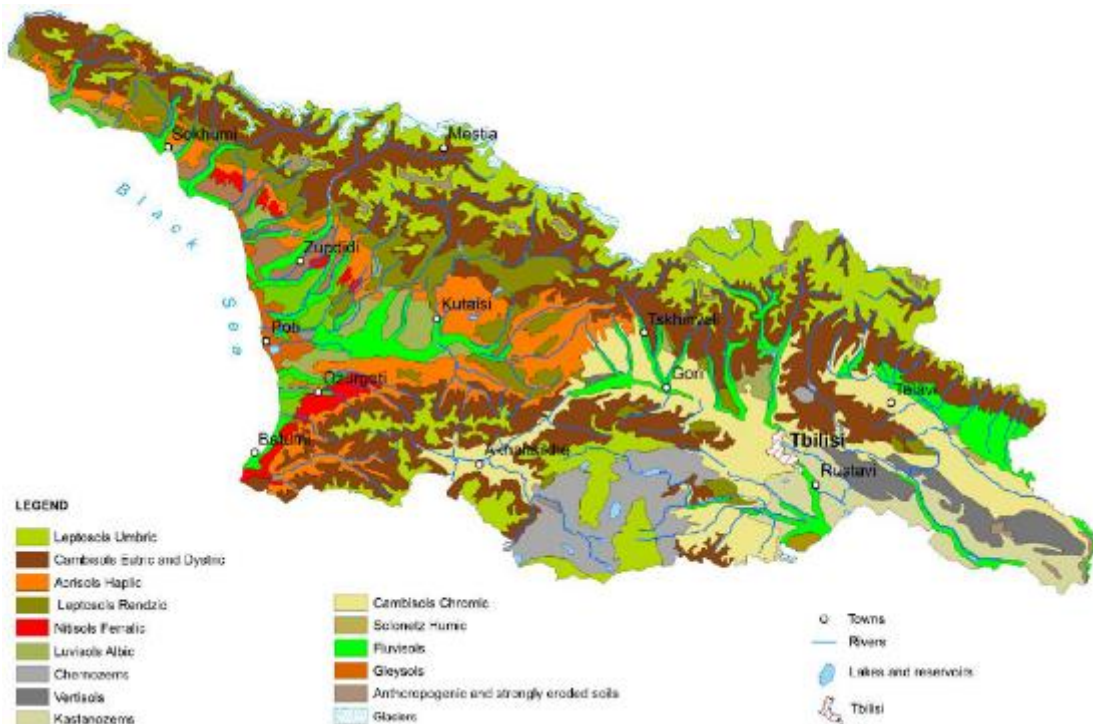


Figure 8: Soil map of Georgia

Source: Urushadze and Ghambashidze 2013, p. 79

Soil erosion is an identified threat in many regions of Georgia, particularly in semi-arid and semi-humid zones.⁵⁸ An estimated 35% of agricultural land is considered degraded due erosion processes, accelerated by anthropogenic use.⁵⁹ The following regions are considered as vulnerable to desertification within the National Action Program to Combat Desertification: Kakheti, Kvemo

⁵⁵ MoENRP 2016.

⁵⁶ Ibid.

⁵⁷ Ibid.

⁵⁸ MoENRP 2014a.

⁵⁹ Urushadze and Ghambashidze 2013; MoENRP 2014a.

Kartli, and Shida Kartli (Figure 9).⁶⁰ Anthropogenic activities, including removing vegetation cover (land and forest degradation), and over-grazing, among others, contribute to accelerating desertification.⁶¹

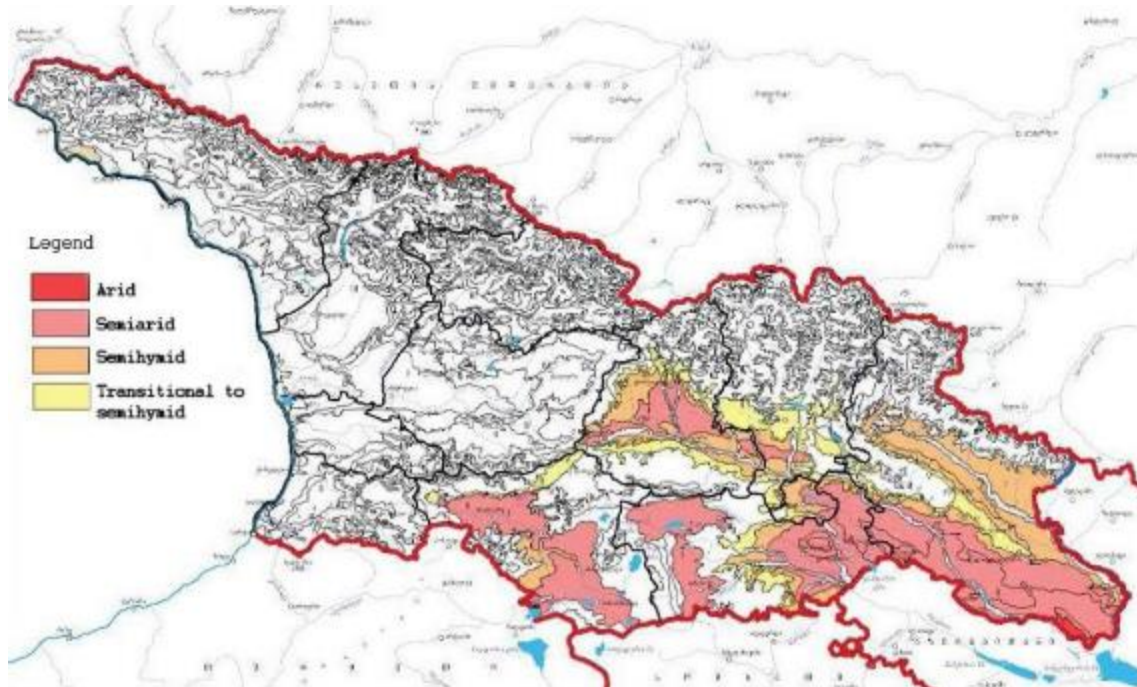


Figure 9: Areas of Georgia with arid, semi-arid, semi-humid, and soils transitioning to semi-humid soils, at a scale of 1:200,000

Source: MoENRP 2014a, p. 40

Land use

Georgia has a land area of 6.97 million ha, of which just under 40% is covered by forests⁶² (2.7 million ha; see Table below). Croplands cover around 13% (911,400 ha), and grasslands⁶³ cover 28% (1.94 million ha) of the national territory (

⁶⁰ MoENRP 2014a.

⁶¹ Ibid.

⁶² For more detailed information on forests refer to the Forest Profile included in Chapter 1.4.

⁶³ Including pasture and hay lands.

Table 1). Settlements cover 894,100 ha, and other non-classified land cover the remaining 1.04 million ha.

Table 1: Land use matrix of Georgia in 2013-2015 (including Abkhazia and South Ossetia), thousand hectares⁶⁴

Land use categories	Land use sub-categories	Area (thousand hectares)		
		2013	2014	2015
1. Forest lands (Covered with forest)	Managed forest	2,521.8	2,424.3	2,423.7
	Forest area in the protected territories	300.6	326.5	326.5
	Total	2,822.4	2,750.8	2,750.2
2. Croplands	Perennial plantations	125.0	109.6	109.6
	Croplands (including sown)	451.0	801.8 (316.6)	801.8 (308.4)
	Total	576.0	911.4	911.4
3. Grasslands	Pastures	1,804.2	1,796.0	1,796.0
	Hay land	135.8	144.0	144.0
	Total	1,940.0	1,940.0	1,940.0
4. Water bodies	Territorial water (Black Sea) area	679.0	679.0	679.0
	Internal waters	215.1	215.1	215.1
	Total	894.1	894.1	894.1
5. Settlements		88.4	88.4	88.4
6. Other land		1,307.5	1,043.7	1,044.3
Total territory of Georgia		7,628.4	7,628.4	7,628.4
Total land area		6,949.4	6,949.4	6,949.4

Source: GEOSTAT

Agricultural activities are concentrated between altitudes from 250 to 1,000 meters above sea level (m.a.s.l). In lowland areas, intensive agricultural activities, including horticulture and viticulture, are more prominent. From 500m onwards animal husbandry, cereals and arable lands are more common. Commonly raised livestock include cattle, sheep and pigs. In grasslands above 1,000 m there are very limited agricultural activities.

Biodiversity

Due to the varied bio-geophysical and climatic conditions present in the country, Georgia is considered an important biodiversity hotspot of global importance. It is considered one of World Wildlife Fund's (WWF) 35 Priority Places (within the greater Black Sea Basin),⁶⁵ and is within two

⁶⁴ Note: There is substantial variation between statistics on land use in Georgia. Statistics from GEOSTAT have been used to the greatest extent possible, but should be interpreted with caution considering the variation in statistics and substantial data gaps in the land use sector.

⁶⁵ For more information on WWF's 35 priority places refer to: http://wwf.panda.org/knowledge_hub/where_we_work/.

of 36 biodiversity hotspots identified by Conservation International and the Critical Ecosystem Partnership Fund (Caucasus and Irano-Anatolian hotspots).⁶⁶

Georgia is home to 4,130 species of vascular plants, and 758 species of chordates.⁶⁷ Around 900 species (21%) of Georgia's flora is considered endemic, of which 900 species are either Caucasian or Georgian endemics.⁶⁸ In total 19 mammals, 3 birds, 15 reptiles and 3 amphibians are considered endemic to the Caucasus region, and one reptile (the Adjarian Lizard, *Darevskia mixta*) is considered endemic to Georgia.⁶⁹ As of 2014, 139 animal species, 56 wooded plant species were included on the national red list, which are threatened due to habitat destruction and over-exploitation.⁷⁰ There are 16 invasive species recorded in Georgia, which are primarily located in semi-natural areas under severe anthropogenic pressure.⁷¹ Natural forests are noted to be "...fairly resistant to the expansion of alien plants".⁷²

Protected areas

Georgia is home to 88 protected areas, covering 595,963 ha in 2019 (8.6% of the national land area; Figure 10). Around 45% of protected areas are covered by forest, comprising 9.5% of the country's total forest area. State protected areas are managed by the Agency of Protected Areas of Georgia (APA).⁷³

The country is also participating in the development of the Emerald Network – "...an ecological network made up of Areas of Special Conservation Interest" launched by the Council of Europe under the Bern Convention (Figure 11).⁷⁴ Currently around 18% of Georgia (over 1.2 million ha) are included within the network, including 39 adopted sites (in green), 7 nominated sites (blue), and 23 proposed sites (in red).⁷⁵

In addition, two Ramsar sites have been declared in Western Georgia, which are considered wetlands of international importance with a combined area of 34,480 ha.⁷⁶

⁶⁶ For more information on CI and CEPF's identified biodiversity hotspots refer to: <https://www.cepf.net/our-work/biodiversity-hotspots>.

⁶⁷ Kobakhidze 2015.

⁶⁸ Ibid.

⁶⁹ Ibid.

⁷⁰ MoENRP 2014b; Kobakhidze 2015.

⁷¹ Kobakhidze 2015.

⁷² Ibid. p. 142.

⁷³ The Law of Georgia on the System of Protected Areas provides more detailed information on the roles and responsibilities of APA, and the legal framework for protected areas in the country: <https://matsne.gov.ge/ru/document/download/32968/15/en/pdf>

⁷⁴ For more information on the Emerald Network and Bern Convention, refer to: <https://www.coe.int/en/web/bern-convention/emerald-network>.

⁷⁵ MoEPA 2018.

⁷⁶ Ramsar Convention 2014.

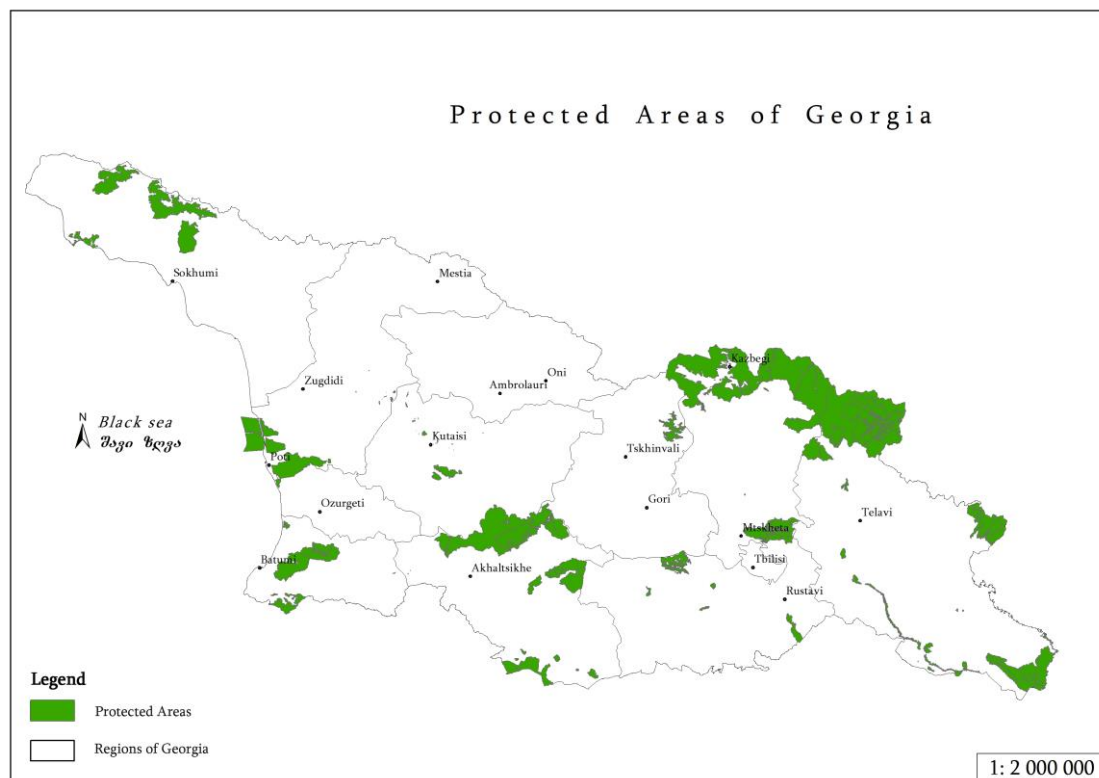


Figure 10: Protected areas of Georgia

Source: APA, no date

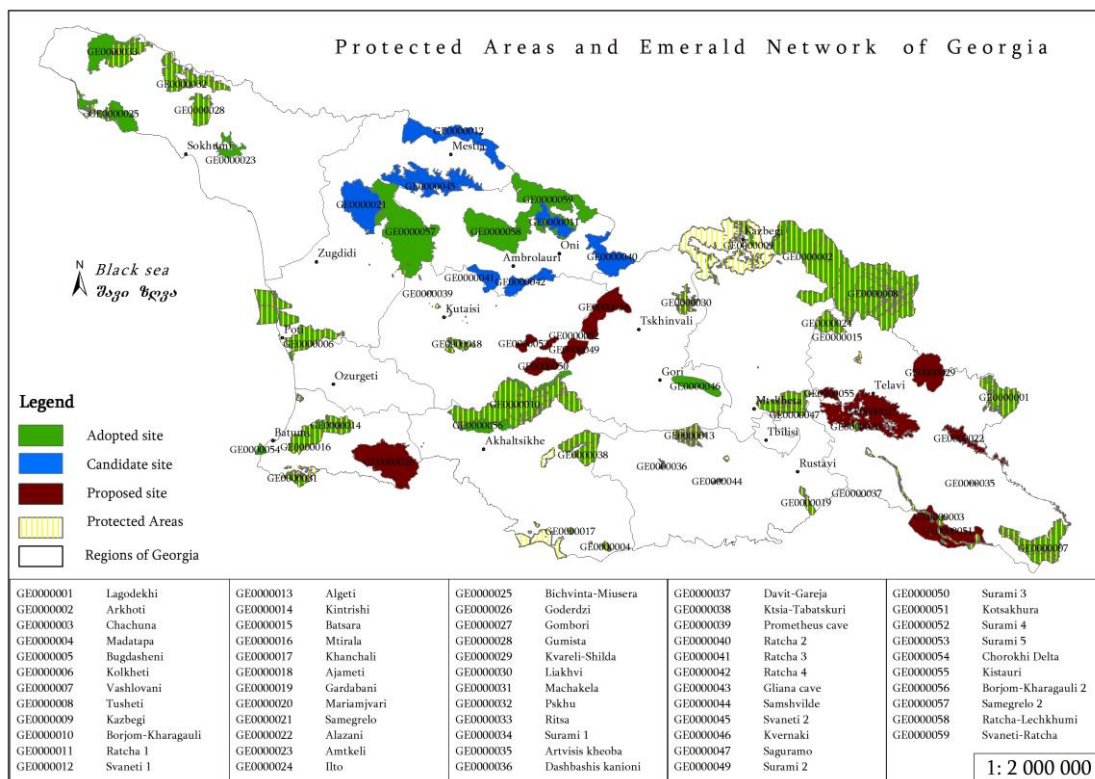


Figure 11: Overview of Emerald sites in Georgia

Source: MoEPA 2018, p. 4

1.4 Forest profile

Forest areas and management bodies

Forests cover almost 40% of the land area and are state owned. The total area of the forest land in Georgia is 3.12 million hectares, out of which 2.69 million hectares are covered with forests (see Table below).⁷⁷ The State Forest Fund (SFF) refers to forests owned by the state, which aims to ensure the integrity of forests and their resources under Georgian Legislation.⁷⁸ It includes territories covered with forests as well as territories not covered with forests that are designated for forestry needs. The State Commercial Forest Fund (SCFF) focuses on all forest areas with the exception of protected areas under the state forest fund.⁷⁹ However, under the new (draft) forest code, the term forest fund will no longer be utilized.

Info Box 2: Forest definition of Georgia

The current Forest Code of Georgia (defines forest as: “...a part of geographical landscape comprising a set of trees attributed to forest by the legislation of Georgia, and land within their propagation area, as well as shrubs, grasses, animals and other components, which are biologically linked in the process of their development and affecting each other and the environment”.⁸⁰

The new forest code will include a new definition of forest land, where forests will be defined as: “areas covered with forest forming species and other territories within the forest contour that are an integral part of the forest ecosystem.” It further defines the term ‘area covered with forest forming species’ as “land plot with the width of minimum 10 meters and an area of not less than 0.5 hectares covered with one or several forest forming timber species, where the tree⁸¹ density per area unit is not less than 0.1”.⁸² The latter definition allows for a more detailed understanding of forests that will facilitate the operationalization of the forest definition, ensuring that policies and promoted measures effectively protect, maintain, monitor, restore and regenerate forests within Georgia.⁸³ For more detailed information on the draft new forest code and the country’s ongoing forest sector reforms, refer to Chapter 5.2.

⁷⁷ The Government of Georgia reported to the FAO Forest Resource Assessment in 2015 that 3,007,600 ha are included in forest fund land, of which 2,822,400 ha are covered by forest. GEOSTAT noted in 2017 the 3,124,200 ha comprise forest and forest land area in Georgia, of which closer to 2,690,000 ha are actually covered by forest. It was decided for the Feasibility Study and Funding Proposal to use GEOSTAT data to the greatest extent available to ensure consistency, especially since GEOSTAT data includes region and district-level data, whereas FAO reported data focuses on the national level. Nonetheless, a degree of caution should be applied when interpreting the data as there is substantial variation between statistics on land use in Georgia.

⁷⁸ Government of Georgia 2011.

⁷⁹ Ibid.

⁸⁰ Government of Georgia 1999.

⁸¹ In the latest version of the draft forest code, a tree is defined as “a perennial timber plant which develops a main stem, or in case of coppice tree – several branches, and forms a branched crown, reaching a minimum of 3m height in maturity”.

⁸² Note: There are ongoing discussions in Georgia whether or not the official forest definition should consider canopy cover or density as both approaches have their own unique advantages and disadvantages. There is a preference to move towards density, as it is a more precise measuring unit that eliminates possible errors from assessing crown cover with spatial tools. This language and approach will be integrated into the forest code. In the latest version of the draft Forest Code, the term ‘Forest’ is defined as “Areas covered with forest forming species and other territories within the forest contour that are an integral part of the forest ecosystem”. The draft Forest Code further defines ‘Area covered with forest forming species’ as “land plot with the width of minimum 10m and area of not less than 0.5 ha covered with one or several forest forming timber species, where the tree density per area is not less than 0.1”. Thus, the updated definition will likely use the term ‘density’.

⁸³ The importance of contextualized and specific forest definitions and concepts is described in various documents including Chazdon et al. 2016. Chazdon et al. (2016, p.1) note “Forest concepts and definitions influence how we assess and interpret forest transitions – the change over time in the balance between forest loss and forest gain within a geographic region – where both loss and gain are defined in terms of tree canopy cover.”

Forests in Georgia are managed by different management bodies. Agency of Protected Areas, Forestry Agency of Adjara, and the National Forestry Agency, among others (

Table 2; Figure 12).

Table 2: Types of forests, areas and responsible authorities in Georgia in 2017⁸⁴

	Forest and forest land area (ha)	Of which covered by forest (ha)
Total forest area of Georgia	3,124,200	2,690,000
Forest area under the Agency of Protected Areas* ⁸⁵	596,200	317,200
Forest area under the Forestry Agency of Adjara	150,100	141,800
Forest Area of Abkhazia AR**	369,000	346,000
Forest area under the mandate of the National Forestry Agency***	2,008,900	1,885,000

* Including Autonomous Republic of Abkhazia and Tskhinvali region

** On January 1, 2003

*** Not including the Tskhinvali region

Source: MoEPA in GEOSTAT 2019e

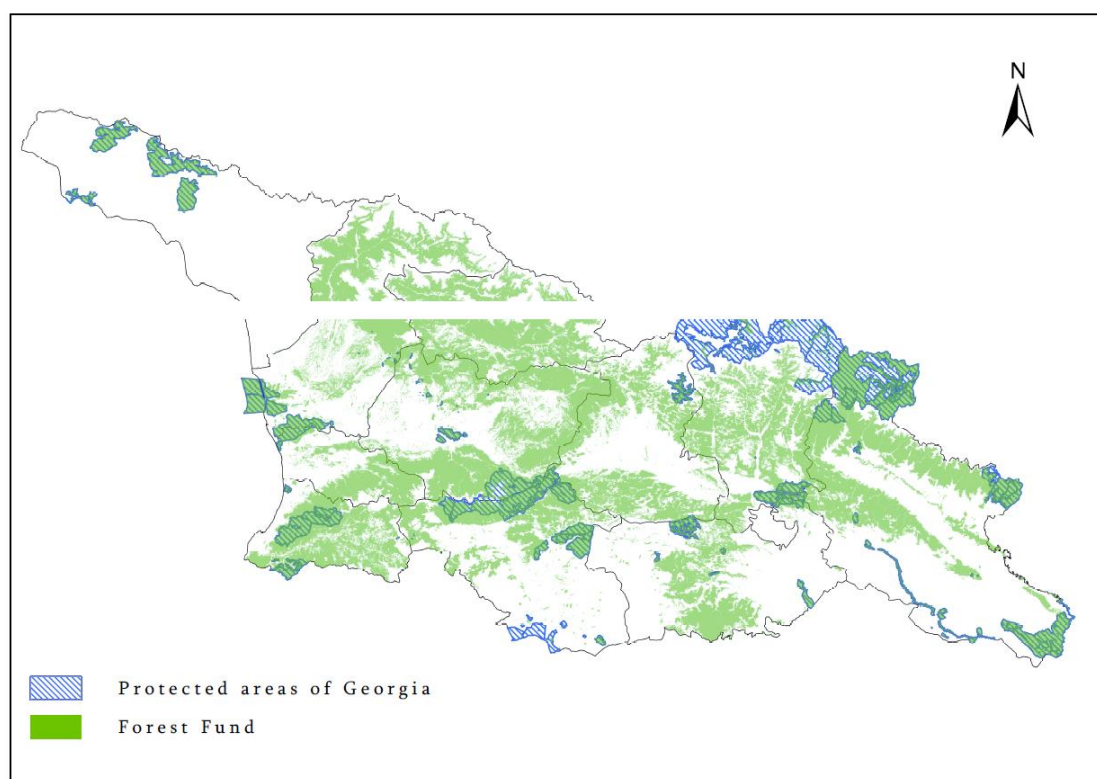


Figure 12: Forest area of Georgia managed by the National Forest Agency (green) and the Agency of Protected Areas (blue)

⁸⁴ As noted above, it was decided for the Feasibility Study and Funding Proposal to use GEOSTAT data to the greatest extent available to ensure consistency, especially since GEOSTAT data includes region and district-level data. Nonetheless, a degree of caution should be applied when interpreting the data as there is substantial variation between statistics on land use in Georgia.

⁸⁵ This is the statistic reported by GEOSTAT. Other statistics imply that only 267,000 ha of forests are managed by APA, whereas the additional area included in this statistic may cover forested land within the Tusheti Protected Landscape (Managed by the Municipality of Akhmeta) and other forested areas managed by different entities (e.g. Tbilisi City Hall).

Source: MoEPA for inclusion in this report

State forest areas under the responsibility of the NFA

Majority of Georgia's forest area, over 2 million ha, are classified NFA-managed forests, which are managed for multiple uses (e.g. recreation, timber and fuelwood production, protection, etc.). Of these 2 million ha, around 1.8 million ha are actually covered by forests (Table 3).

Table 3: Forest area of Georgia under the National Forestry Agency⁸⁶

	Forest area (ha)	Of which covered by forest (ha)
Total Forest area under NFA*	2,008,900	1,885,000
Guria	85,900	82,500
Imereti	312,400	299,900
Kakheti	288,400	268,200
Mtskheta-Mtianeti	250,500	235,400
Racha-Lechkhumi and Kvemo Svaneti	281,900	267,800
Samegrelo-Zemo Svaneti	272,300	256,000
Samtskhe-Javakheti	133,400	128,100
Kvemo Kartli	146,700	133,500
Shida Kartli	237,300	213,600

Note: The discrepancy between the totals and the sum in some cases can be explained by using rounded data

*Excluding Tskhinvali region.

Source: MoEPA in GEOSTAT 2019e

Forests managed by other management bodies

About 0.36 million ha of forest are classified as forests managed by other management bodies than those listed above. This includes forests in protected areas managed by local self-governing bodies (e.g. the Tusheti Protected Landscape that covers 4,500 ha and is managed by Akhmeta Municipality), usable forests managed by local self-governing bodies, forests owner by local self-government with recreation zone status and managed by local self-governing bodies (e.g. Tbilisi City Administration manages 8,000 ha of greenery around Tbilisi), and forests in Adjara that are managed by the LEPL Forestry Agency of Adjara.⁸⁷

Biophysical characteristics of Georgia's forests

Georgian forests are divided into highland and plain forests, however almost all forests (97.7%) are located on hilly and mountainous slopes. NFA estimates there is a growing stock of 330.3 million m³ of deciduous trees, and 124.2 million m³ of coniferous trees. Species composition can be summarized of the following species of woody plants: leafy species: beech (50.9% of growing stock), hornbeam (5.4%), oak (5.2%), alder (3.0%) and chestnut (2.8%); coniferous species: fir

⁸⁶ As noted above, it was decided for the Feasibility Study and Funding Proposal to use GEOSTAT data to the greatest extent available to ensure consistency, especially since GEOSTAT data includes region and district-level data. Nonetheless, a degree of caution should be applied when interpreting the data as there is substantial variation between statistics on land use in Georgia.

⁸⁷ Green Alternative 2016; Chiburidanidze 2017; UNECE 2017

(16.7%), spruce (7.4%), and pine (3.2%).⁸⁸ Natura2000 habitat directives based on the CORINE biotopes classification system identified 24 forest habitat types in Georgia.

In Western Georgia forests begin from sea level and cover lowlands and foothill slopes up to 500 m above sea level. In lowland swampy areas species such as willow, poplar, Imeretian oak, ash and beech may be present. In higher elevations and foothills there are Colchis forests. In under-story areas, species such as rhododendron and bilberry, among others, grow. In areas with lime soils in western Georgia and in some drier districts of eastern Georgia (e.g. Kartli, Gare Kakheti) oaks and hornbeams are widespread.

In lowland areas and foothill slopes up to 400 –600 m above sea level in drier areas of central and eastern Georgia (e.g. Shiraki, Eldari, Mtskheta-Mtianeti, among other), forests are mostly composed of Georgian maple, pomegranate, and pistacia, junipoerus. In lower mountainous zones (from 500 m to 900–1000 m) there are oak and chestnut forests. Chestnuts are found in both eastern (Kakheti) and western Georgia. Medlar, hawthorn, cornel, nuts, etc. grow in mountainous regions in the 'lower zone' of mountainous regions. In the 'middle zone' of mountainous regions (from 900 m–1000 m to 1500 m–1600 m) beech is growing in some cases purely and in some cases mixed with hornbeam, field maple, lime, spruce, etc.

1.5 Energy profile

Georgia depends on imports for over 50% of its primary energy requirements and by 98% as regards natural gas and oil products.⁸⁹ Low carbon energy sources such as hydropower and natural gas are important for electricity, while the bulk of heating requirements are met by natural gas and biomass (fuelwood). Georgia has high potential for the development of hydropower resources, as well as other renewables, such as solar, wind, geothermal and various forms of biomass. Hydropower is for now the most important renewable energy resource in Georgia: it satisfies more than 90% of the electricity demand. Biomass is the most important source of heat in rural areas and is often used by many households in urban centers.

From the early 1990s through to 1995 primary energy demand was in free fall. This is illustrated in the Figure 13 below, where by 1995 energy demand was at one third of that at the beginning of the decade. Contraction has primarily affected demand for oil and gas, whereas the supply of fuelwood and its share in the total energy demand has actually increased during this period. Primary energy demand broadly reflects the economic decline and it only resumed growth in 2002, having bottomed out at 25% of the demand 12 years earlier.

⁸⁸ FAO 2014; Note: these figures slightly differ from the growing stock used within the baseline calculated in Chapter 5.1 and the Forest Model described in Chapter 5.2.3.4. This is due to the use of different databases and studies, especially for the forest model which focuses on areas with similar growing characteristics to the project area. Nonetheless, the results were similar for most species with the exception of birch – which is 10% higher in the forest model (60%). The forest model assumptions are described in greater detail within Chapter 5.2.3.4.

⁸⁹ IEA World Energy Balances 2018 - <https://webstore.iea.org/world-energy-balances-2018>

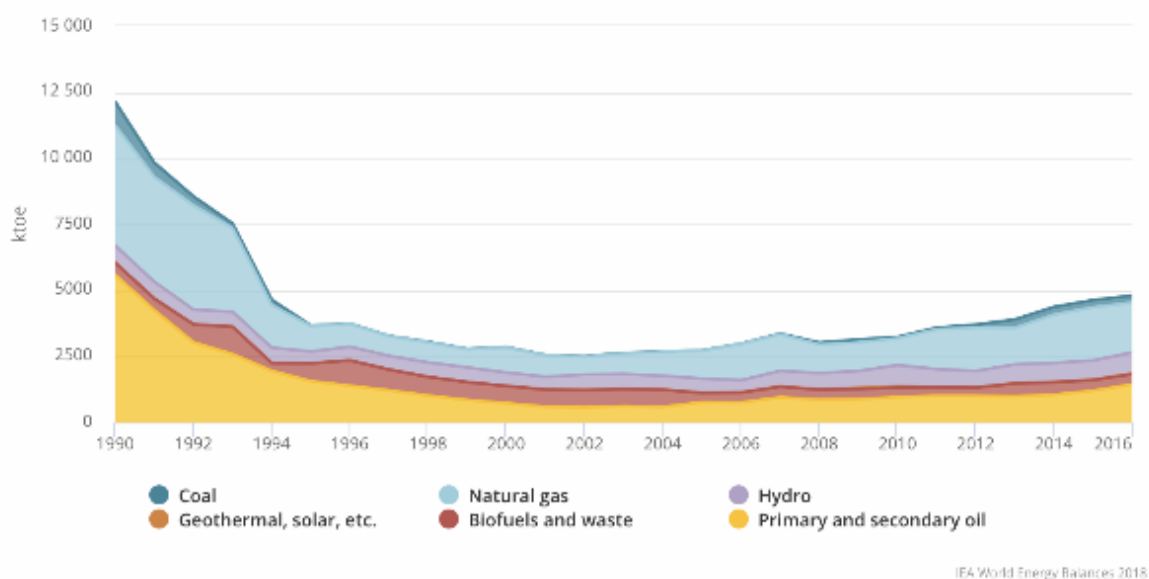


Figure 13: Total Primary Energy Supply (TPES) by source, 1990-2016

Source: IFA World Energy Balance 2018

The total final consumption (TFC) by energy source is illustrated in Figure 14, which shows the dominance of oil and natural gas in the total final energy consumption. Following the initial collapse in 1991/1992, the structure of the total final energy consumption in Georgia did not change very much until 2004, when natural gas and oil demand surged and the use of fuelwood for heat production reduced (fuelwood is included in “biofuels and waste” category). The total final energy consumption grew by 22% between 2004 and 2008. Over the same period gas consumption increased by 64% and oil consumption grew by 59%. The TFC of heat produced from fuelwood reduced to below its pre-1990 level for the first time in 18 years in 2008, when it accounted for 15% of the total final energy consumption.

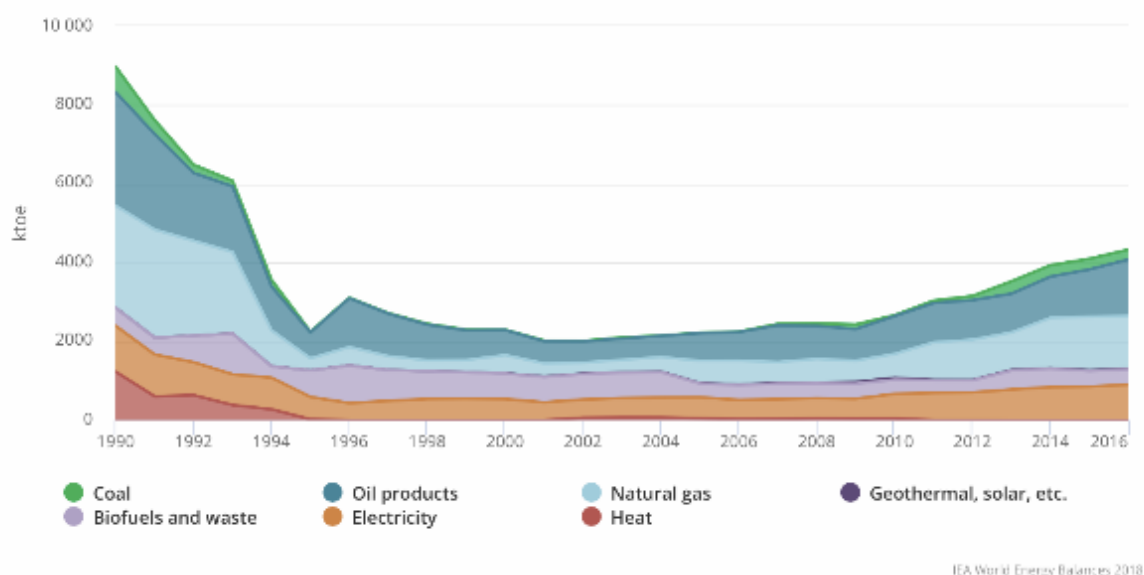


Figure 14: Total Final Consumption (TFC) by source, 1990-2016

Source: IFA World Energy Balance 2018

The pattern of final energy consumption in the residential sector reflects the traumatic developments in natural gas, heat, electricity and oil supplies and affordability in the sector since 1990 and continuing through to 2003, when the situation began to stabilize (Figure 15). Following its initial collapse, the consumption of natural gas has exhibited steady growth since 2002 and is now at its highest level since 1994, accounting for 52% of the residential final energy consumption, in 2016. Electricity consumption has been relatively stable over the whole 18-year period. The biggest source of heat in the residential sector over the whole of the period is from fuelwood. It peaked in 1996 at over 900 ktoe per annum and dropped later to stabilize around 330-400 ktoe (an equivalent of 2 million m³ of fuelwood⁹⁰) to meet about 30% of the final energy consumption in the residential sector in 2016 (Figure 16).

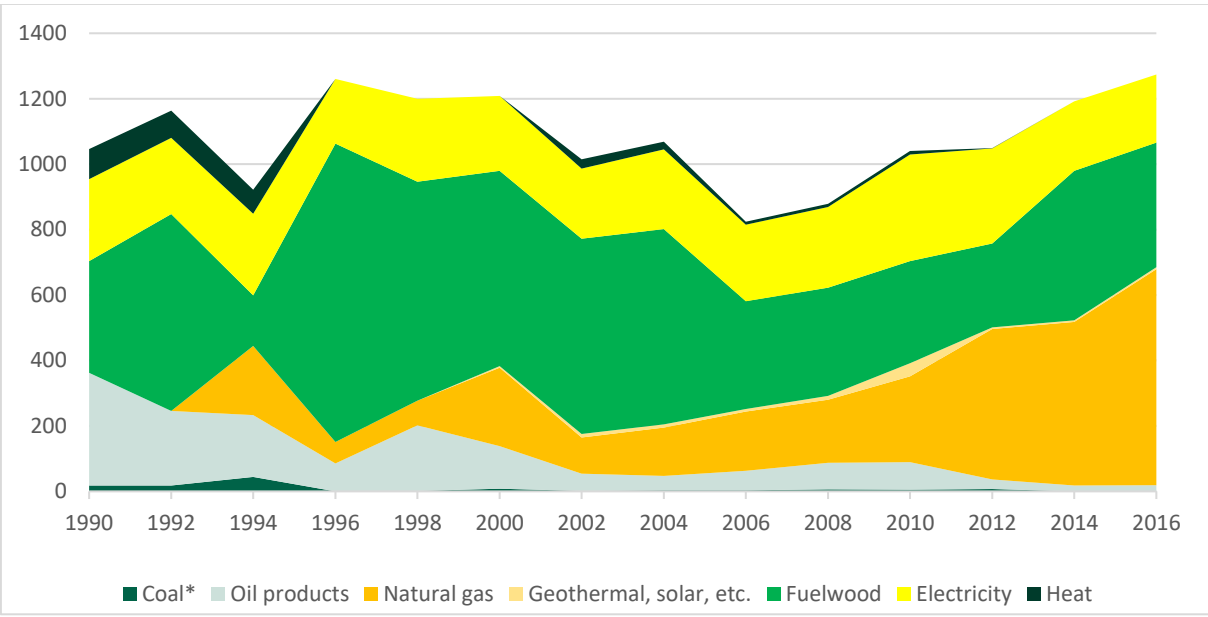


Figure 15: Final Energy Consumption by Georgia's Residential Sector, 1990-2016, ktoe
Source: IFA World Energy Balance 2018

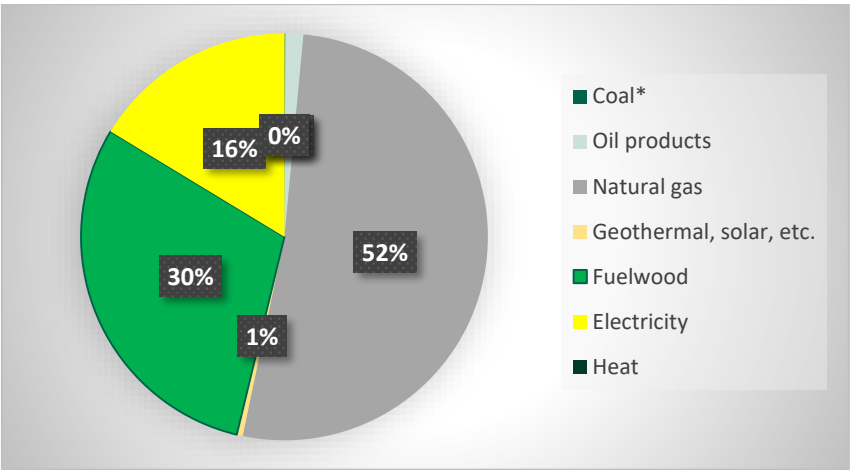


Figure 16: Final Energy Consumption by Georgia's Residential Sector by Source in 2016, ktoe
Source: IFA World Energy Balance 2018

⁹⁰ Assuming calorific value of fuelwood at 2167kWh/m³, based on Geostat.

2 INSTITUTIONAL, POLICY AND REGULATORY FRAME- WORK

2.1 Institutional framework

Figure 17 and

Table 4 provide an overview of the key governmental entities that are relevant for the implementation of the GCF project in Georgia.

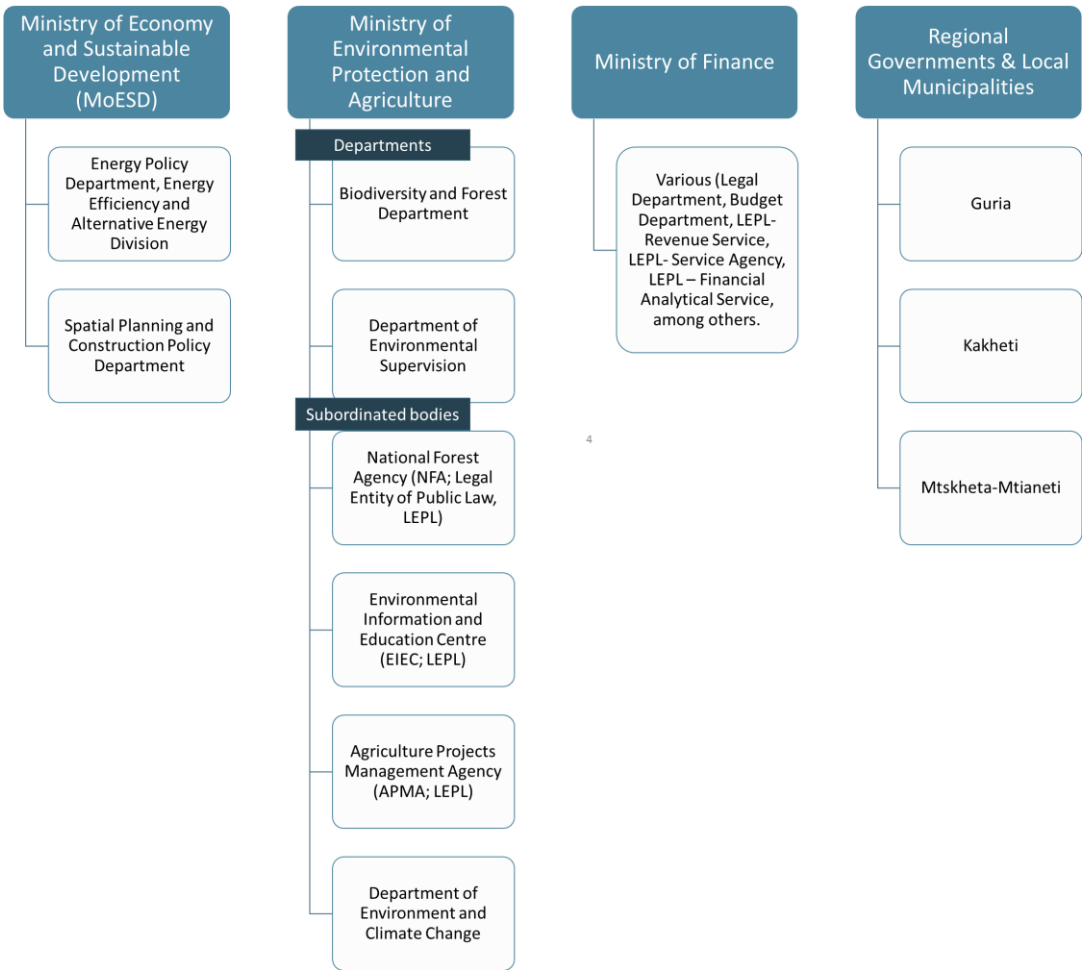


Figure 17: Overview of main institutions for project implementation

Table 4: Responsibilities of main institutions for the Georgian forest and energy sectors

Name of institution	Responsibility
Ministry of Economy and Sustainable Development (MoESD)	MoESD's enhanced mandate covers economic policy planning and implementation; preparation of the Sustainable Development Strategy; development of the transport and logistic sectors; elaboration of policies, strategies and programs in the energy sector; design and implementation of action plans for renewable energy development and energy efficiency measures; and coordination of the climate change and sustainable energy development topics in energy sector.
MoESD - Energy Policy Department, Energy Efficiency & Alternative Energy Division	Key state body responsible for the implementation of national energy efficiency policy in Georgia. The Government of Georgia plans to develop its institutional capacity – likely by setting up an EE Agency – to faster implementation of successful energy efficiency programs and promotion of investments.
MoESD - Spatial Planning and Construction Policy Department	Responsible for the regulation of the building sector.
Ministry of Finance (MoF)	MoF prepares the annual fiscal budget to reflect the main priorities of economic development of the country. MoEPA reports to the MoF regarding the financial resources coming from international donors for climate change-related projects. In addition, MoEPA requires MoF approval for any financial loans.
Ministry of Environmental Protection and Agriculture (MoEPA)	<p>The Ministry in charge of regulating environmental protection and agriculture. Related to the forestry sector, they are responsible for the definition of sectoral policies, drafting of legislative and legal acts, dividing of forest by functional purposes, organization of the forest inventory system including national forest inventory, approval of forest management plans for the state and the private forest, and supervising the State Management Body, among other functions.</p> <p>The Ministry also serves as the official UNFCCC Country Focal Point and National Designated Authority (NDA) for the GCF.</p>
MoEPA – Biodiversity and Forest Department (BFD)	BFD is a structural unit of MoEPA. It is responsible for defining forest and biodiversity policies, and supervising implementation. BFD, mainly its Forest Policy Division, is responsible for the elaboration of the policy and legal framework of the forest sector.
MoEPA - Department of Environmental Supervision (DES, State Sub-Agency)	Responsible for the: prevention and detection of illegal use of natural resources, prevention and detection of environmental pollution; and the control of natural resource license requirements.
MoEPA – Environmental Information and Education Centre (EIEC, Legal Entity of Public Law)	EIEC has the aim to raise the public awareness on environmental protection, support public participation in the decision-making process and increase access to justice. ⁹¹ EIEC acts as a mediator between the environmental protection policy developing and implementing parties and ensure that strategies, legislation and policies are explained to the target groups in a simple language and format. It further has a mandate in environmental education and capacity building.

⁹¹ It serves as the representative institution for the implementation of the Aarhus Convention.

Name of institution	Responsibility
MoEPA - National Forest Agency (NFA, Legal Entity of Public Law)	NFA manages over 1.8 million ha of forest land, and is the sole entity responsible for forest management in these areas (see following sub-chapter for a more detailed overview of NFA's roles and responsibilities).
MoEPA – Department of Environment and Climate Change	Responsible for the development of climate change policy and strategy of the country and participation in its implementation as well as monitoring. It is the focal point for UNFCCC secretariat.
MoEPA –Agricultural and Rural Development Agency (ARDA, Non-entrepreneurial (Non-commercial) Legal Entity of Public Law) ⁹²	ARDA supports the implementation of various investment support projects initiated by MoEPA, as well as the management of subordinate agricultural companies. It has various initiatives to reach its objective of promoting rural development, including providing financial guarantees and subsidies for prioritized agricultural investments.

Info Box 3: Legal Entity of Public Law

The Law of Georgia on Legal Entities under Public Law (LEPL, 1999) outlines the legal framework for the establishment, procedures and organization of LEPLs in Georgia.⁹³ The law states that a LEPL is “a separate organization from legislative and state government bodies, established under an appropriate law, an ordinance of the Government of Georgia or an administrative act of state government body based on law, which independently carries out political, state, social, educational, cultural and other public activities under state control; it is also a separate organization from state government bodies, established under a normative act of supreme executive body or an autonomous republic, which independently carries out social, educational, cultural and other public activities under state control.”⁹⁴

LEPLs are subject to state control, implying “supervision of the lawfulness, appropriateness and efficiency of its activities, as well as of its financial and economic activities”. LEPLs can generate their own finance, as described under Article 13 of the law. LEPLs with an income that exceed GEL 1 million (in addition to their state budget allocation), must agree on a budget together with the responsible Government authority.

NFA and EIEC are LEPLs. They all generate their own funds through while also utilizing government budget. Profit made is reinvested in the organizations, however additional state budget is required for their operation, and their budgets must be approved by state authorities. MoEPA plays a supervisory role for these institutions, approving their budget, among other tasks. In the instance of NFA, FMPs for forests under NFA management must be revised and approved by MoEPA, and forest supervision is conducted by MoEPA through the Department of Environmental Supervision.

⁹² NOTE: Prior to July 1, 2019 ARDA was called APMA the “Agriculture Project Management Agency.” For more information on ARDA, refer to their website: <http://apma.ge/page/read/agency/>

⁹³ Law available online: <https://matsne.gov.ge/ru/document/download/19204/19/en/pdf>

⁹⁴ LEPL Law (1999), p. 1.

2.1.1 Forest Sector

Key government institutions in the forest sector for the implementation of this project are the Ministry of Environmental Protection and Agriculture (MoEPA), the National Forest Agency (NFA) and the Department of Supervision (DES). NFA and DES are subordinated institutions under supervision of the Ministry.

The following sub-chapter provide an overview of each institution's mandate and organizational setup. The capacities and challenges and barriers of these institutions to implement sustainable forest management as envisaged under the forest sector reform are discussed in Chapter 5.2.

Ministry of Environmental Protection and Agriculture (MoEPA)

The Ministry of Environmental Protection and Agriculture (MoEPA) is the main state authority responsible to define and implement the state policy for environment, forest, agriculture and rural development sectors.⁹⁵

The competences of the Ministry in the forest sector include the definition of sectoral policies, drafting of legislative and legal acts, dividing of forest by functional purposes, organization of the forest inventory system including national forest inventory, approval of forest management plans for the state and the private forest, and supervising the State Management Body.

To fulfill its function regarding the forest sector, the Ministry maintained the following structural units:

- Biodiversity and Forest Department (BFD)
- LEPL National Forest Agency (NFA)
- LEPL Agency of Protected Areas (APA)
- LEPL Department of Environmental Supervision (DES).

The Biodiversity and Forest Department of MoEPA

The Biodiversity and Forest Department (BFD) within MoEPA is responsible for forest policy in the country. The BFD is responsible for defining and implementing forest and biodiversity policies, and supervision implementation. BFD, mainly its Forest Policy Division is responsible to elaborate the policy and legal framework of the forest sector and supervise its effective implementation in the country. The Department, in close collaboration with the NFA already conducted a considerable work to create a favorable framework for the SFM development and implementation: The National Forest Concept was developed and approved by the Parliament in 2013⁹⁶, the new Forest Code⁹⁷ was elaborated and is currently within the Parliament for the approval, the draft of national principles, criteria and indicators for SFM, and management-level criteria and indicators for ecosystem-based forest management were developed and are pending for the approval by the Ministry.⁹⁸

⁹⁵ An organizational chart is available in Appendix 1.

⁹⁶ The Concept defines the State's approach to forests, taking into account the main functional purpose of forests and their values. This document will serve as a basis for the development and improvement of the forestry sector related legislation, institutional set-up and other policy documents.

⁹⁷ The new Forest Code is based on the principles of sustainable management of forest, proceeding from the "National Forest Concept of Georgia". Georgian forests shall be managed considering ecological, social and economic principles.

⁹⁸ See Chapter 5.2 for more detailed information on the criteria and indicators mentioned.

National Forest Agency (NFA)

The National Forestry Agency, was created based on the Law of Georgia on Management of Forest Fund in 2013.⁹⁹ Its mandate comprises of the following main fields of activities:

- Forest inventory and planning on NFA-managed forest areas;
- Forest maintenance and restoration (incl. fire prevention measures);
- Monitoring of NFA-managed forests;
- Developing and implementing measures of forest protection from illegal use;
- Logging;
- Issuing the right of use for NFA-managed forest areas;
- Allocation of areas for social cuts; and
- Construction and / or rehabilitation of forest roads, among other responsibilities.

The NFA manages 2 million ha of forests (of which over 1.8 million ha are covered with forests). Organizational wise, NFA has a central office in Tbilisi and nine regional forest service offices (see Figure 18) throughout the country.



Figure 18: Forest regions of NFA

Source: National Forest Agency

In the past these regions were divided into forest districts often consisting of 1-3 administrative districts, which have to develop and implement forest management plans. However, under the new forest code, FMPs will be made for each administrative district (i.e. no more combined districts).

The main funding sources of the agency are state budget, own funds/ revenue, and targeted grants. NFA generates their own revenue from various sources, including (among others):¹⁰⁰

- revenues from selling timber resources;
- service fees for timber logging tickets;

⁹⁹ An organizational chart is available in Appendix 1.

¹⁰⁰ Detailed figures are provided in Chapter 5.2, related to the financial baseline for the forestry sector.

- revenues from issuing the right of NFA managed forests;
- compensation fees;
- service fees for issuing timber origin document or issuing;
- timber origin document and marking with special badge; and
- revenues from selling timber origin documents and / or special badges.

Department of Environmental Supervision (DES)

DES is a state body under the auspices of MEPA and has the following mandate:¹⁰¹

- Prevention and detection of illegal use of natural resources;
- Prevention and detection of environmental pollution; and
- Control of natural resource license requirements.

The Department has a wide range of following competences to fulfil its mandate:

- Inspection and examination of regulation objects;
- Issuing administrative offence reports;
- Assessing damage to the environment;
- Issuing administrative orders; and
- Sending criminal cases to the investigation bodies.

While DES received some forestry supervisory functions in 2013, the sector reform will transfer more responsibility and supervision functions to DES. DES will have a stronger role in the supervision of activities in the forests areas itself. This mandate has been with NFA and is in the process of shifting to DES (since early 2019).

Objects of regulation of interest to the forest sector are license holders (commercial logging), wood resource users (social logging), other owners of wood (wood logged in private property / obtained under special logging / transferred into state property and imported wood) and wood processing facilities.

The objective of the department in the forest sector is to prevent, detect and eliminate illegal logging, transportation, processing and realization of timber. Control mechanisms available to DES are legal status of timber documents, labelling of round timber and electronic systems for managing timber resources and managing sawmills.

For fulfilling their mandate in the field DES has two main “instruments”:

1. Immediate response: The immediate response squads are equipped with vehicles, firearms, documentation tools and observation equipment. The squads patrol on 24h/7 duty in their respective regions. Their mandate include the inspection of sites and areas for obtaining and processing natural resources and drawing up the protocol for administrative law violation.
2. Inspection: Inspectors implement scheduled or impromptu inspections and have the mandate to draw up an inspection act and/or protocol for administrative law violation and assessing damage to the environment.

¹⁰¹ An organizational chart is available in Appendix 1.



Figure 19: Regional DES offices
Source: Department of Environmental Protection

Environmental Information and Education Centre (EIEC)

The Environmental Information and Education Centre was established in 2013 as a Legal Entity of Public Law (LEPL) within the structure of MoEPA. It serves as the representative institution for the implementation of the Aarhus Convention, with the aim to raise public awareness on environmental protection, support public participation in the decision-making process and increase access to justice.

EIEC has the following functions:¹⁰²

- To create a unified data base on environmental protection and support its publicity;
- To ensure public access to the timely and an adequate information on the state of environmental protection;
- To support public participation into the environment related decision-making processes;
- To support public participation into the environment related surveys;
- To timely disseminate information about public discussions of reports concerning impact on the environment;
- To disseminate information about adoption of new legislative acts or legislative amendments in the field of environment;
- To carry out different activities and events in order to raise awareness on environmental issues among the target groups;
- To study public demand for environment related information;
- To support environmental education in Georgia and coordinate an implementation of the respective activities.

¹⁰² EIEC 2019.

The Centre has four units: Education Projects Service, Environmental Information Service, Informational Technologies Service and Administration Service. The Informational Technologies Service has two divisions: System Administration Vision and Technical Support Division.¹⁰³

2.1.2 Energy sector

Ministry of Economy and Sustainable Development of Georgia

MESD is the key governmental body in charge of national policies in the area of energy efficiency and renewable energy, it is also in charge of developing and implementation National EE and RE Action plans.

Agricultural and Rural Development Agency (ARDA, formerly known as Agricultural Projects Management Agency, prior to July 1st, 2019)

Non-Entrepreneurial (Non-Commercial) Legal Entity “Agricultural Projects Management Agency” (APMA) was established in 2012 by Ministry of Agriculture of Georgia in order to promote rural development in Georgia. Agency is functioning under the supervision of First Deputy Minister of Environmental Protection and Agriculture of Georgia. From July 1, 2019 the official title of Agricultural Projects Management Agency (APMA) was changed into Agricultural and Rural Development Agency (ARDA).¹⁰⁴

ARDA’s mission is to promote rural development in Georgia by implementing various projects initiated by the Ministry of Environmental Protection and Agriculture of Georgia. The Agency will develop projects not only in Agricultural but also in environmental as well as rural development fields. ARDA aims to support Georgia’s rural development in a long-term perspective and create such an environment that will encourage competition in agriculture, increase stable growth of high-quality products and support food safety and food security. Agricultural and Rural Development Agency is funded by the state budget and other sources according to the legislation.

The projects/programs that are being managed and implemented by ARDA are the following:

- Plant the Future – consists of two components: 1. Co-financing perennial gardens; 2. Co-financing nursery gardens.
- Georgian Tea Plantation Rehabilitation Program
- Program of Agro-production Promotion – aims to support primary production, product quality and maintenance of productivity increase; promote the maximum possible utilization of the acting gardens; stimulate the growth and modernization of acting processing and warehousing agro-enterprises; implement International standards and modern technologies.
- Preferential Agro-credit Project – purpose is to improve the processes of primary agricultural production, processing, storage and sale by providing the legal and natural entities with cheap, affordable long-term and preferential funds.
- Young Entrepreneur - the program supports young entrepreneurs in rural area. The Program is designed for young people being residents of Georgia and desiring to conduct a business activity in Georgia.

¹⁰³ An organizational chart is available in Appendix 1.

¹⁰⁴ An organizational chart is available in Appendix 1.

- Co-financing of Agro Processing and Storage Enterprises.
- Agro-insurance - The Agency concludes contracts with the relevant insurance companies licensed under the rules envisaged by the legislation of Georgia in order to implement the project. The Agency also carries out insurance premium subsidies and their monitoring based on the above-mentioned contracts.
- Program of Co-financing Agricultural Machinery
- Farms/Farmers Registration Project - regulates a system of the united registry of farm-ers/farms which will consolidate information on the entities employed in the agricultural activities, their agricultural-economic activities and agricultural assets existing in their own-ership/maintenance in the united electronic database.

As of June 30, 2019, there are 338 employees and 32 independent contractors in ARDA, out of which 217 people are based in nine regions of Georgia.

2.2 Forest policy and regulations

Existing policies and regulations in the forestry sector are largely imperfect. Therefore, a major forest sector reform process has been initiated in 2013 (see chapter 5.1 for a description of regulatory and policy challenges, and chapter 5.2 for a detailed description of ongoing forest sector reforms). Although most of the related key documents are still waiting for final approval it is already clear that climate change mitigation and adaptation will play a major role in Georgia's new forest sector policy. In this context, the National Forest Concept, one of the few documents that has already been approved by the Georgian Parliament (in 2013) - paving the way for the whole reform process not only argues for "the need to help forests to adapt to climate change" but also recognizes that "Forests play an important part in the global carbon cycle by absorbing carbon from the atmosphere and storing it in woody matter and forest soils".

A new forest code, that institutionalizes sustainable forest management, has been drafted and is currently undergoing parliamentary hearings. It is expected that the new forest code will be adopted in 2019. SFM is a complex issue and interpretations of this term differ from country to country. In an attempt, to reach a common understanding of what is meant by sustainable forest management under the specific Georgian circumstances, National Principles, Criteria and Indicators for SFM have been elaborated. Five principles of sustainable forest management, which have been agreed in the process of Georgia's forest sector reform, are included in the document. The following table provides a summary of the existing legal and policy framework for the forest sector in Georgia.¹⁰⁵

¹⁰⁵ Note: Many broader environmental laws, strategies and programs include forests among other environmental themes. The linkage to forests within these policies/ laws/ strategies, etc. is noted within the summary Table in Chapter 2.

Table 5: Overview of forest legislation, policy and strategies

Title	Brief description of elements of particular relevance for the project
Legislation¹⁰⁶	
The Forest code of Georgia (1999)*	<p>Framework sectoral legal act that regulates legal relations connected with the maintenance, protection, restoration and use of the forest land of Georgia and its resources (Article 1). The Principle of Sustainable Management is recognized as the main principle of forest management. It defines the forms of ownership of forests and issues of institutional management (no precedent for private property). As well as issues related to accounting and monitoring of the State Forest land (Article 25); Forest use and cutting types (Article 51, 52,53,70); issues of Voluntary Certification of Forest (Article 94, although such practice does not exist yet); the issue of the State control of forest and forest legislation (Article 108).</p> <p><i>*Note: The existing forest Code has been adjusted several times and is considered as no longer appropriate, due to many contradicting regulations in related laws and regulations (see Chapter 5.1 and 5.2 for more information). A new forest code has been drafted and is expected to be approved by mid-to-late 2019. Detailed information on the new (draft) forest code is provided in Chapter 5.2.</i></p>
Georgian law on management of the forest fund ¹⁰⁷ (2010)	Regulates matters related to the management of the forest land , which shall be performed by NFA within the system of MoEPA (formerly MoENRP). It includes the main goals and objectives of the NFA for forest land management, power of the agency when managing the fund, and information regarding the legal status of the agency (and clarifying that revenues from the NFA can directly support the financing of the agency). It further references types of permitted forest use (in line with forest code and ordinance on forest use [Procedures for Forest Use]), and forest user obligations , among other articles.
Policies, concepts, strategies and action plans	
The National Forest Concept, (2013)	<p>The National Forest Concept defines the State's approach to forests, taking into account the main functional purpose of forests and their values. It sets national priorities and actions in the field of forest management:</p> <ul style="list-style-type: none"> ▪ Forest management planning: restoration of degraded forests; reforestation; and sustainable use of forests ▪ Rational use of forest resources ▪ Forest ownership, management and use rights ▪ Adaption to the impacts of climate change
National Forest Program process (2013-ongoing)	Supports the forest sector reform in Georgia , while involving all stakeholders in the decision-making process. Several thematic working groups were established to support their ongoing work. It supported the development of National Principles, Criteria and Indicators for SFM, and Management-level Criteria and Indicators for Ecosystem-based Forest Management (described in Chapter 5.2 in greater detail).

¹⁰⁶ Much of the mentioned legislation in the forest sector has undergone various revisions and changes. Refer to Appendix 5 for an overview of the number of amendments.

¹⁰⁷ Government of Georgia 2011; the law will not be in force after the adoption of the New Forest code.

Info Box 4: Key regulations for forest management

For the registration, planning and management of forest areas on forest land in Georgia, the following three key secondary legal acts/ regulations are particularly critical. These resolutions have been adjusted various times throughout the years. Despite these changes, these resolutions form the basis of the regulatory framework for forest management in the country.

Resolution 241: Regulation of Forest Protection, Reforestation and Maintenance (approved on August 13, 2010)

The purpose of the Regulation of Forest Protection, Restoration and Maintenance is to regulate legal relations in implementation of forest protection, maintenance and reforestation activities on state forest land, in order to ensure maintenance and enhancement of ecological balance, conservation of age structure, species composition and qualitative conditions of forests, establishing of sustainable and highly productive forest stands, enhancing opportunities of forest use, and preventing negative factors resulted from changing climate.

Resolution 242: Forest Use Regulation (approved on August 20, 2010)¹⁰⁸

This regulation determines the forest use rules within state forests. It specifies: forest use types, types of services provided by NFA, fees for the NFA's services, rules of cutting area marking, allocation, and timber production, rules for issuance of timber production certificates (tickets), rules for issuance of the certificate for use of forest resources, rules for transferring forest land for usage (incl. initial annual auction prices), amount of compensation for special purpose forest use, and fees for services provided by APA per m³ of harvested wood, while harvesting timber in protected areas by local population of protected area surroundings. The priority of the acting legislation was mainly logging for social purposes.¹⁰⁹

Resolution 179: The Rule of Forest Registration, Planning and Monitoring (approved on July 17, 2013)

Resolution 179 outlines the rules for registration, planning and monitoring of forests within the territory of State forests. It defines: a) the types of forest registration, implementation methods and requirements; b) the methods for conclusion of the forest management and utilization plans, consideration and approval procedures thereof; and rules and methods for forest monitoring.

The resolution determines:

- a) Types of forest inventory, methods of their implementation and requirements;
- b) Methods of elaboration of plans of forest management and forest use, procedures of their consideration and approval;
- c) Rule and methods of implementation of monitoring.

Under the upcoming forest code, the Resolution #179 will be replaced by three regulations:

- a) on categorization and management of forests,
- b) on inventory and monitoring system, and,
- c) on establishing and adjusting the borders of forest territories.

More detailed information on these secondary legal acts/ resolutions is available in Chapter 2, with specific reference to the new forest code and required adjustments to the regulatory framework.

¹⁰⁸ Note: Active forest law amendments are very frequent. In the timeframe of 2008-2012, the Resolution #242 was amended 40 times. State Audit Office 2016b.

¹⁰⁹ State Audit Office 2016b.

2.3 Energy policy and regulations

Georgia does not currently have an overarching energy strategy. The general strategic framework for energy sector development can be summarized as mostly being linked to three key priorities:

1. Accession to the EU and approximation of the energy market and legislation to the EU's *acquis communautaire* – which is especially relevant for this GCF project as it mandates approximation of the key EU Directives in the field of energy efficiency;
2. Energy independence from imports of natural gas and oil products from Russia; and
3. Receipt of revenues from the export of electricity to neighboring countries (especially Turkey) and acting as a physical go-between for the transport of natural gas, oil, and electricity from the energy producing countries of Russia and Azerbaijan.

Related to the approximation of the EU's *acquis*, in June 2014, the EU and Georgia signed an Association Agreement¹¹⁰, which entered into force on July 1 2016. This, along with the Deep and Comprehensive Free Trade Area (DCFTA) Agreement, which includes commitments on energy security, energy markets and more efficient use of energy builds a foundation for far-reaching Georgian political and economic integration with the EU.

Georgia joined the Energy Community as a full-fledged member in the course of 2017, following the ratification of the accession agreement by the Georgian Parliament. According to the Protocol on the Accession of Georgia to the Energy Community Treaty signed in October 2016, Georgia has specific obligations to implement energy efficiency *acquis*, including the following EU Directives:

- 31 December 2018 for the Energy Efficiency Directive 2012/27/EU;
- 30 June 2019 for the Energy Performance in Buildings Directive (EPBD) 2010/31/EU;
- 31 December 2018 for the Energy Labelling Directive 2010/30/EU; and
- 31 December 2018 for the Ecodesign Directive, 2009/125/EC.

The most relevant progress made during the previous year from January 2018 to January 2019 was the preparation of the Law on Energy Performance of Buildings (EPB Law), the Energy Efficiency Law (EE Law), and the Law on Energy Labelling aimed at transposing the primary legislation required by the energy efficiency *acquis*. All three have been approved by the Government and the EPB Law and Energy Labelling Law have been officially adopted by the Parliament in 2019. The EE Law is scheduled for adoption by the Parliament in QII 2020. Requirement of public bodies to purchase EE equipment where feasible. The EE Law also introduces requirements for public bodies to purchase EE equipment where feasible with the State Procurement Agency being responsible for implementation of these provisions. Amendments in the State Procurement law was also initiated and passed the first hearing in the parliament of Georgia.

Under requirements of the Energy Efficiency Directive, with the support from EBRD, Georgia's first National Energy Efficiency Action Plan (NEEAP) for 2019 – 2020 was prepared and adopted in 2019. The Plan set the overall energy efficiency target and sectoral targets for buildings, industry and transport.

¹¹⁰ https://eeas.europa.eu/delegations/georgia/9740/eugeorgia-association-agreement_en.

The Government has also initiated preparation of the new National Energy and Climate Plan for the period 2020-2030, which shall be submitted to the Government for approval by the end of 2020.

As a full member of the Energy Community Treaty, Georgia plans to follow the provisions of the EU Directives and transpose the *acquis communautaire* according to the Energy Community work program. According to the provisions of the Directive 2009/28/EC on the Promotion of the Use of Energy from Renewable Sources, every Contracting Party has to draw up and promote a National Renewable Energy Action Plan (NREAP) to present to the Energy Community Secretariat with a view to comply with the binding targets stated within the Directive.

National Renewable Energy Action Plan (NREAP) has been drafted and its adoption is expected along with the Renewable Energy Law (RE Law) in 2020. Provisions related to the promotion of renewable energy in heating and cooling sectors are to be transposed by the renewable energy law and the law on energy performance of buildings.

Table 6: Key legislative and strategic documents in the area of energy efficiency

Title	Brief description of elements of particular relevance for the project
Legislation	
Law on Energy Efficiency	<ul style="list-style-type: none"> Implement the EU's Energy Efficiency Directive (EED - 2012/27/EU), help Georgia to meet its commitments under the Energy Community Treaty and the EU Association Agreement, and achieve the goals set out in the National Energy Efficiency Action Plan (NEEAP). <p>Specific elements of the law which are relevant include:</p> <ul style="list-style-type: none"> Establishes the NEEAP as the document for establishing EE targets at a national level Requirement of public bodies to purchase EE equipment where feasible (Responsibility of the State Procurement Agency) Requirement for setting up of certification programs for energy auditors and for publication of information on them (Responsibility of the Georgian Accreditation Center to approve certifying organizations) Language to encourage end-user energy efficiency amongst consumers via awareness raising, financial measures, and training.
Law on Energy Performance of Buildings	<p>To approximate the Energy Performance in Building Directive. This includes specific relevant provisions to:</p> <ul style="list-style-type: none"> Require private buildings sold or rented and all public buildings with more than 500 m² (lowered to 250 m² on 30 June 2023) and visited often by the public and to have energy performance certificates Set minimum energy performance standards for primary energy consumption for new buildings or buildings which undergo major renovations – to a cost-effective level. Require that all new buildings shall satisfy the requirements of Nearly Zero Energy Buildings unless it is not cost-effective to do so. Requires regular inspections of boilers Encourages public education on the topic of EE in buildings and review of financing measures to encourage EE <p>Various secondary legal acts are also required for the full implementation of the EPBD.</p>

Title	Brief description of elements of particular relevance for the project
<p>Law on Renewable Energy¹¹¹ (Currently in draft form, adoption expected in mid-2019, being drafted by Ministry of Economy and Sustainable Development, with some delegated responsibilities to GNERC and / or local authorities)</p>	<p>To define open issues and approximate the Renewable Energy Directive. Relevant provisions of the draft include:</p> <ul style="list-style-type: none"> ▪ Requiring that targets are set within the Renewable Energy Action Plan ▪ Promotion of the installation of renewable energy sourced for new buildings and settlements amongst local self-governing units ▪ Definitions of what constitutes renewable energy (including biomass) ▪ Requirement of RE in new or substantially refurbished buildings starting in 2025 and for public buildings starting in 2022 ▪ For biomass stoves, the Government should promote those conversion technologies that ensure achievement of a conversion efficiency of at least 85% for residential and commercial applications and at least 70% for industrial applications. ▪ For solar hot water, the Government should promote the use of certified equipment and systems based on European standards where these exist, including eco-labels, energy labels and other technical reference systems established by the European standardization bodies. ▪ Requires the setting up of training / information distribution to the public on RE, setting up of certification programs for RE installers (small-scale biomass boilers and stoves, solar photovoltaic and solar thermal systems, shallow geothermal systems and heat pumps), and may have lists of certified installers ▪ The Government shall ensure that guidance is made available to planners and architects, as well as to all relevant actors, so that they are able properly to consider the optimal combination of renewable energy sources, of high-efficiency technologies and of district heating and cooling when planning, designing, building and renovating industrial or residential areas. ▪ The Government with the participation of local self-government and regional governmental authorities shall develop suitable information, awareness-raising, guidance or training programs in order to inform citizens of Georgia of the benefits and practicalities of developing and using energy from renewable sources.
<p>Draft¹¹² Main Directions of the State Energy Policy of Georgia (2015-ongoing, Ministry of Economy and Sustainable Development leading its elaboration)</p>	<p>The aim is to develop a long-term comprehensive state vision, which will later become the basis for the development of short, medium, and long-term strategies for 2030, with a special emphasis on the utilization of Georgia's renewable energy resources. The Energy Policy of Georgia defines nine strategic energy policy directions of which three are related to sustainable energy:</p> <ul style="list-style-type: none"> ▪ Utilization of Georgia's renewable energy resources; ▪ Develop and implement an integrated approach to energy efficiency in Georgia; ▪ Gradual approximation and later harmonization of Georgia's legislative and regulatory framework with the EU Energy acquis. <p>The development of renewable energy resources is key to tackling climate change and deploying cleaner sources of energy as well as decreasing Georgia's dependence on imported energy. Attracting investments in RES sector is a strategic goal for Georgia.</p>
<p>Strategies and action plans</p>	

¹¹¹ http://hydropower.ge/user_upload/6.HIPP_Report_on_RES_Law.pdf.

¹¹² <http://www.energy.gov.ge/projects/pdf/news/Sakartvelos%20Energetikuli%20Politika%20Proekti%20Araofitsialuri%20Ingლისური%20Targmani%20796%20geo.pdf>.

Title	Brief description of elements of particular relevance for the project
National Energy Efficient Action Plan (NEEAP) of Georgia (Drafted by the Ministry of Economy and Sustainable Development, expected adoption in early 2019 for the period impacting 2019 – 2021)	<p>Includes Georgia’s indicative national energy efficiency targets for 2021, 2025, and 2030. Specific measures listed in the NEEAP which are relevant for the project include:</p> <ul style="list-style-type: none"> ▪ Adoption and implementation of the EPBD / energy efficiency standards in buildings (policy measure triggering investments) ▪ Implementation of EE measures in schools, kindergartens, and other public buildings (to be funded through IFI / lending + donor grants) ▪ Support for efficient biomass stoves (to be funded through donor grants) ▪ Support for solar hot water heaters (to be funded through donor grants)
Renewable Energy Strategy of Georgia, including Biomass Strategy (developed earlier in 2017, currently under review)	<p>The main goal of the biomass strategy is to promote the use of solid biomass in Georgia by stimulating the production and use of modern solid biofuel. Biomass strategy will form an integral part of the National Renewable Energy Strategy of Georgia (under development). The strategy defines basic directions and state measures in support of upgraded solid biofuels (USB) production and consumption in Georgia. Main directions of the strategy include:</p> <ul style="list-style-type: none"> ▪ Sustainable management and provision of supply of solid biomass residues from forest, agriculture, industry and other sources; ▪ Support of the advancement of the new technologies and business processes for the production of the solid biofuels; ▪ Encouragement of the sustainable production and demand for the energy received from biomass residues. <p>The following topics are discussed in the strategy: definition of the responsible body, necessary changes in the legal framework (RE legislation, Taxation, tax incentives for business, waste management); standardization (introduction of standards for biomass and fuels), as well as for appropriate manufacturing and consumption technologies; stimulation of demand; Innovative and logistic support, awareness raising and enhancement of knowledge & skills; seek financing from IFIs and climate funds; Creation of sustainable production processes.</p>

2.4 Environmental policy and regulations

The following table provides an overview of key environmental legislation, policy and strategies in Georgia, of particular relevance to the project. Georgia is further a signatory party of various international conventions related to the environment, including the United Nations Framework Convention on Climate Change (UNFCCC), United Nations Convention to Combat Desertification (UNCCD), and the United Nations Convention on Biological Diversity (CBD), among others.

Table 7: Overview of key environmental legislation, policy and strategies in Georgia

Title	Brief description of elements of particular relevance for the project
Legislation	
The Criminal Code of Georgia, (1999)	The Code establishes the basis for criminal liability , determines which action is criminal, and establishes a relevant sentence or other criminal sanction. Article 10 of the Code regulates crimes related to environmental protection and use of natural resources . Specifically, the Article 287 ¹ - violation of the requirements for the registration of sawmill, Article 303 - illegal cutting of trees and bushes ; Article 304 - Damage or destruction of tree or growing stock.
Georgian law on protecting the soil ¹¹³ (1994)	Aims to: i) ensure soil integrity, fertility, and maintenance ; ii) determine responsibilities [land users, owners and government] for soil conservation and environmentally-friendly production; iii) prevent negative consequences of the use of agrochemicals; iv) ensure the protection of sub-alpine and alpine meadows by preservation of endemic vegetation and soil in the highlands; and v) facilitate the coordination of activities in the field of reclamation. It prohibits various activities including: damage of soil due to forest use, cutting/altering protective forest areas , damaging soil protective structures, excessive grazing, over exploitation of sub-alpine and alpine endangered, among others.
Law of Georgia on Environmental Protection ¹¹⁴ (1996)	Use of natural resources with consideration of environmental principles and sustainable development. It serves as a core legal framework that sets the foundation for other environmental legislation. ¹¹⁵ The law integrates the basic requirements of international treaties and agreements related to environmental protection , notably related to climate change, biological diversity .
The Law of Georgia "On Fees for Natural Resource Use" (2004)	The law defines the objects of fees for the use of natural resources and rates of fees, as well as the rules of payment. Including the fee for the use of the timber resources of the State forests, the amount of which is determined according to the groups of woody species and categories (Article 5, item 2). For non-timber resources: the fees are determined only for use of cones of fir-tree, bulbs of snowdrop and tubers of cyclamen (Article 5, item 3). According to the rule of payment, the payments are transferred to the local budgets of the region from which the resources are obtained. Based on the payment set forth in this Law, the amount of damage (penalty) inflicted by the illegally obtained resources is calculated , that is determined by the resolution. Technical regulations - the methodology for determining (calculation) environmental damage. The amount of payment is also used to determine the initial price of a license on use of nature.
The Law of Georgia "On Licenses and Permits" (2005)	The law regulates the sphere regulated by a license and a permit, determines the comprehensive list of licenses and permits , establishes the rules for issuing licenses and permits, introducing of changes in them and their cancellation. The type of license in forestry is a general license of forest use, which includes a special license for timber production and hunting farming (Article 7, item 4), also license on use with the purpose of export of cones of fir-tree and snowdrop bulbs and/or cyclamen tubers that are included in the annexes to the convention. "On international trade in endangered species of wild fauna and flora" (CITES) (Article 7, item 9). The issue

¹¹³ MoENRP 2016b.

¹¹⁴ Government of Georgia 1996a.

¹¹⁵ MoENRP 2016b.

Title	Brief description of elements of particular relevance for the project
	is legally specified by the Resolution of the Government of Georgia #132, "On Approval of the Regulations on the Rules and Conditions for Issuing Forest Use Licenses".
Law of Georgia on Environmental Impact Permits ¹¹⁶ (2017)	Facilitates protection of the environment and natural resources from irreversible quantitative and qualitative changes, and their rational use. Defines the cases where an environmental impact assessment is required).
Environmental Assessment Code ¹¹⁷ (MoEPA published draft law in June 2017, still under discussion)	Environmental assessment code will envisage the requirements of the Convention "on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters" (Aarhus Convention) in the environmental protection issues and will ensure public participation in the decision-making process in relation with effects on the environment, particularly to bring potential negative impact of high risk activities on the condition of the natural environment, as well as on human life and health under the environment assessment regulation, in compliance with the requirements of EU directive 2011/92/EC "on the assessment of the effects of certain public and private projects on environment ". ¹¹⁸
Liability Law (currently in draft form, anticipated approval in late-2019)	<p>The law clarifies responsibilities related to environmental liability, and is based on the 'polluter-pays' principle. It establishes rules and procedures aimed at preventing and remedying of damage to the environment (water, land, protected species and natural habitats) based on the polluter-pays principle. It provides provisions related to the evaluation of remedial options following an environmental damage, establishes strict liability for dangerous occupational activities, obligations for operations to adopt suitable prevention and remediation measures (incl. liability for costs), and mechanisms for affected persons (incl. NGOs) to request action by competent authorities where environmental damage is suspected, including an independent review process.</p> <p>The financial means for preventing and remediating environmental damage should be managed in the form of an ecological insurance and environmental damage fund. If it is possible to identify the person/ entity liable for environmental damages, they will be fined and the money transferred to the environmental damage fund. If it is not possible to identify the person/ entity liable, additional state funds will be available within the fund to contribute to environmental remediation. However, the fund is in the early stages of its development, and its institutional set up is not yet clear.</p>
Strategies, action plans and programs	
Government of Georgia National Risk Strategy and Action	Aims to create a unified, flexible and efficient system which ensures the reduction of natural and man-made disaster risks by joint efforts and coordinated activities in Georgia. The action plan includes various activities to be implemented that sup-

¹¹⁶ Government of Georgia 2017b.

¹¹⁷ Government of Georgia 2017c; This law in turn has cancelled two laws that were in force before: Law of Georgia "On the Permits for Impact on Environment" (2007), Law of Georgia "On Ecological Expertise" (2007) that did not meet modern standards and procedures of environmental assessment.

¹¹⁸ According to this law, the following activities related to forestry will be subjected to EIA: the production of cellulose from wood or similar fibrous material, production of more than 200 tons of paper and / or cardboard daily (Annex 1, item 25); While planting of 500 hectares of forest or more and / or cutting of 50 hectares of forest or more with the purpose of transformation into other categories of land and use; (Annex 2, Activity 1, item 1.4).

Title	Brief description of elements of particular relevance for the project
Plan 2017-2020 ¹¹⁹	port disaster risk reduction. Related to forests it includes the classification of Georgian forests according to fire hazards, ensuring the formation of fire-resilient forest stands, and strengthening the legal framework for forest and valley fire risk reduction, among other measures.
3 rd National Environmental Action Program of Georgia 2017-2021 (NEAP 3)	<p>Outlines a number of relevant activities to be carried out in the period of 2017 – 2021, including the revision of the forest code, promotion of access to alternative fuel sources (biomass) for population and public entities, and preparation of Low Emission Development Strategy (LEDS) which includes various measures related to energy efficiency. It further discusses other climate change commitments (Biennial Update Reports, National Communications, Climate Change Strategy – see Chapter 3.3 for further details).</p> <p>A review of NEAP3’s progress in achieving its targets so far related to forest management is provided in Appendix 2.</p>
National Biodiversity Strategy and Action Plan of Georgia 2014-2020 ¹²⁰	<p>Defines the strategy and specific actions for biodiversity protection and sustainable use for the period from 2014-2020. Key targets include:</p> <p>By 2020, sustainable use and economic values of biodiversity and ecosystems are integrated into legislation, national accounting, rural development, agriculture, poverty reduction and other relevant strategies; positive economic incentives have been put in place and incentives harmful to biodiversity have been eliminated or reformed.¹²¹ A revision of the progress made so far in achieving key targets under the action plan is provided in Appendix 2.</p> <p>Revision of the document and elaboration of NBSAP 2021 is already ongoing, with involvement of BFD and other stakeholders, and shall be finalized in 2020.</p>
Second National Action Program to Combat Desertification 2014-2022 ¹²²	<p>Defines the strategy and priority actions for combatting desertification for the period from 2014-2022. Highlighted main barriers for addressing desertification in Georgia, notably: inadequate funding, lack of awareness of local population, and weak technical basis, among others. Priority actions include: i) capacity building, ii) the protection, restoration and increase of forest areas, iii) increasing the role of local communities in fighting against desertification (incl. securing local communities with alternative energy sources), iv) improved identification of zones/ territories facing desertification, v) improved stock-taking of land conditions, and vi) taking action against erosion and unsustainable land management through increasing the adoption of sustainable land management in the land use sector, among others.</p>
Strategy for Agricultural development in Georgia 2015-2020 ¹²³	Fostering the competitiveness of agriculture; ensuring the sustainable management of natural resources , and climate action; and achieving a balanced territorial development of rural economies and communities including the creation and maintenance of employment.

¹¹⁹ For more information refer to: <https://www.preventionweb.net/english/professional/policies/v.php?id=54533>.

¹²⁰ MoENRP 2014b.

¹²¹ The strategy includes the specific target to improve the legal and institutional frameworks for the commercial use of non-timber plant resources, which is a legal grey area. While a draft version of this regulation has been drafted, further work is needed and it will not be completed prior to 2020.

¹²² MoENRP 2014a.

¹²³ Ministry of Agriculture of Georgia 2015.

2.5 Development plans and strategies

There are three main development strategies of Georgia that provide orientation for national and regional sustainable development in Georgia:

1. Social-economic development strategy of Georgia (Georgia 2020)
2. Rural Development Strategy of Georgia 2017-2020
3. Regional Development Programme of Georgia 2018-2021.

The following table provides a brief description of these plans, paying particular attention to elements that are relevant for the project. Additional information on development plans and strategies specific to climate change are presented in the Chapter 3.1.2.

Table 8: Overview of national and regional development plans in Georgia

Title	Brief description of elements of particular relevance for the project
Social-economic Development Strategy of Georgia 2020 ¹²⁴ (2014-2020)	<p>The third main principle of the Strategy is based on rational use of natural resources, ensuring environmental safety and sustainability and avoiding natural disasters during the process of economic development. It further acknowledges the negative impacts of climate change on the country's economy.</p> <p>Specific indicative statements related to EE/AF include the following:</p> <ul style="list-style-type: none"> ▪ Energy efficiency will be enhanced and relevant legislative mechanisms will be drawn up in accordance with international and European norms in order to preserve the country's energy resources. The efficient use of energy is important as a means of increasing the country's energy independence and rational use of resources, and can potentially decrease future costs. ▪ Building natural gas infrastructure/metering in regions Government of Georgia will continue building natural gas infrastructure in villages, introducing individual meters and building electricity infrastructure in villages that have no electricity. This will lead to lessened consumption of natural resources for heating/fuel and improved social conditions in the regions. <p>Specific indicative statements related to forests include the following:</p> <ul style="list-style-type: none"> ▪ The introduction of modern models of forest management and innovative technologies will reduce the negative consequences of forest degradation. ▪ The protection of forests and introduction of rational practices for their use will significantly improve the population's socio-economic standing - noting that many key economic sectors are dependent on healthy forest ecosystems (e.g. development of agriculture, hydro-electric power generation, tourism, etc.)
Rural Development Strategy of Georgia 2017-2020 ¹²⁵	<p>Follows the EU's six priorities for rural development including: fostering knowledge transfer in innovation in forestry, agriculture, and rural areas, restoring preserving and enhancing ecosystems related to agriculture and forestry, promoting resource efficiency and supporting the shift towards a low carbon and climate resilient economy in agriculture, food and forestry sectors, and promoting social inclusion, poverty reduction and economic development in rural areas, among others.</p> <p>It identifies "Environmental Protection and the Sustainable Management of Natural Resources" as a priority area, with the specific objectives to: i) improve the management of forests, water and other resources in targeted rural areas, ii) promote sustainable systems of waste management in rural areas, and iii) implement activities that mitigate the negative impact of climate change.</p>

¹²⁴ Government of Georgia 2014a.

¹²⁵ Government of Georgia 2017a.

Title	Brief description of elements of particular relevance for the project
Regional Development Programme of Georgia 2018-2021 ¹²⁶	<p>Medium-term strategic vision to support regional development, focusing on territorial integrated interventions, considering territorially differentiated potentials. Provides a coherent framework for public and private investments to support regional development.</p> <p>Key measures within the program include the improvement of energy infrastructure and expanding renewable energy potential, and preserving and promoting natural resources, among others. It notes that current energy infrastructure hampers regional development, and emphasizes the need to continue rural gasification processes and promote renewable energy and alternate fuels.</p> <p>The forest sector was identified as a '<i>high potential sector</i>' to be strengthened, particularly in the regions of Kakheti, Guria, Mtskheta-Mtianeti, and Racha Lechkhumi-Kvemo Svaneti. Tourism and agricultural development are also noted as priority areas for regional development.</p>

¹²⁶ Government of Georgia 2018.

3 CLIMATE PROBLEM

Georgia's forests play a pivotal role in regulating net GHG emissions of Georgia and their sink potential is critical in securing net removal of GHG emissions. Climate change impacts and the demand for fuelwood from the rural population, however, put substantial pressure on forests resulting in significant degradation of forests and loss of its carbon absorption capacity. The following sub-chapters establish the case for this project by depicting the climate change risks associated with Georgian forests present greenhouse gas emissions context, and national climate goals and priorities. The methodology applied for assessing climate risk and vulnerability is provided in Appendix 3.

3.1 Greenhouse gas emissions from Georgian forests

3.1.1 GHG Emission Profile

Georgia has conducted four national GHG inventories covering time periods between 1980s and 2013 (Table 9). According to the First Biennial Update Report (BUR) on Climate Change, GHG emissions from Georgia in 2013 constituted 16,679 Gg in CO₂eq (35% of 1990 emissions), without consideration of the LULUCF sector, and 12,555 Gg CO₂eq when taking this sector into account.

Table 9: Georgia's GHG emissions inventories

National GHG inventories	Period covered
First National Communication (FNC, 1997-1999)	▪ 1980-1996
Second National Communication (SNC, 2006-2009)	▪ 1998-2006
Third National Communication (TNC, 2012-2015)	▪ 2006-2011
First Biennial Update Report (BUR)	▪ 2010-2013, sectors covered: Energy, Industrial Processes, Solvents and other Product Use, Agriculture, Land use, Land- Use Change and Forestry (LULUCF) and Waste ▪ 2010-2011 recalculated for various sectors

The emission and removal trends by sector for 1990-2013 are provided in the following Figure 20. In 1990, emissions amounted to 47,187 Gg CO₂eq. Emissions reached their minimum value in 1995 (8,799 Gg CO₂eq.), primarily due to the collapse of the economic system of the Soviet Union. In 1995, emissions started to increase, but the growth rate was lower than the reduction trend in the years of 1990-1995.

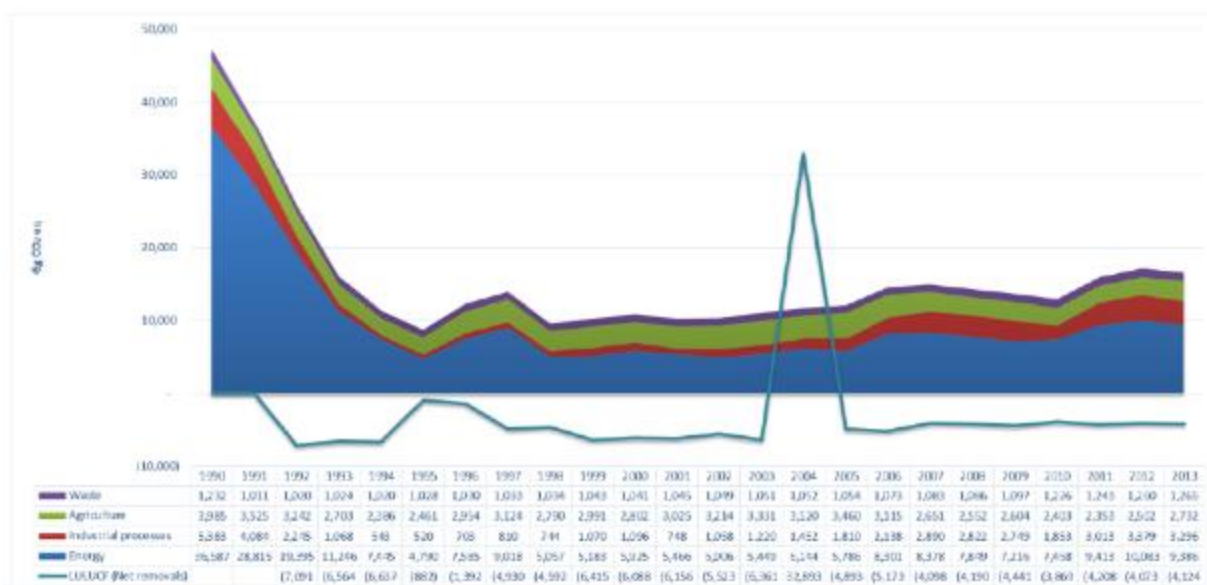


Figure 20: GHG emissions in Georgia by sector for 1990-2013¹²⁷

Source: MoENRP 2016a

Energy Sector

Energy is a dominant sector in terms of Georgia's GHG emission profile, accounting for more than half of the country's total GHG emissions in 2013 (9,386 Gg in CO₂eq, or 56% of Georgia's total GHG emissions – excluding LULUCF). The sector's emissions have declined from 1990 levels, where the sector was responsible for 78% of national GHG emissions. A large share of emissions from the energy sector is due to fuel combustion (80% in 2013) and the remaining 20% is caused by fugitive emissions. During 2000-2013, GHG emissions from the industry and transport sectors increased ~4.7 and 2.8 times, respectively. In the transport sector, GHG emissions increased due to the growing auto-park and a majority share of second-hand cars in the park. In total, the three largest sources of GHG emission in the energy sector were in 2013: transport – 33%, manufacturing industries and construction – 21%, gas transmission and distribution sub-sector – 19%.¹²⁸

Land Use, Land Use Change and Forests (LULUCF)

The accurate GHG emission profile of the LULUCF sector is difficult to depict due to missing or conflicting data. Neither there is a forest reference emission level available for Georgia, nor detailed data for the other land categories. Most recent profiles (with differing results) are available in the BUR and the draft Low Emission Development Strategy (LEDS).¹²⁹

¹²⁷ LULUCF sector had a net sink of greenhouse gases during 1992-2013, except 2004, in which net source of emissions were observed. This sharp change is mainly attributed to the cropland category, in particular orchards in perennial plants. Changes in land cadaster data in 2004 caused these, as they specified the boundaries of perennial orchards, and areas covered with perennial crops were almost halved (MoENRP 2016a).

¹²⁸ MoENRP 2016a.

¹²⁹ Low Emission Development Strategies are long-term strategies to support the transition to low-emission development pathways. The term 'LEDS' emerged from the UNFCCC, and is included within the Paris Agreement (Article 4, Paragraph 19) where all parties should strive to formulate and communicate long-term low greenhouse gas emission development strategies. LEDS typically include:

The following Figure shows the main land categories as provided in the IPCC guidelines:¹³⁰ Nearly 40% of Georgia is covered by forest lands, 25% by grasslands and 12% each by wetlands and croplands. The latest key source-category assessment, conducted as part of Georgia's First Biennial Update Report, determined that forest land and grasslands including pastures are the most important LULUCF sub-sectors.

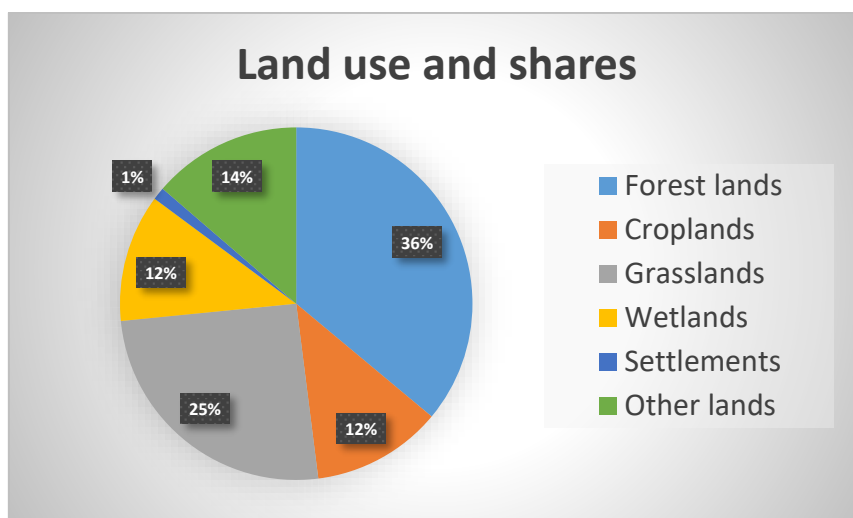


Figure 21: Land use and shares¹³¹

Source: WEG GHGs National Inventory 2010-2013

GHG emission/removal inventory 2010-2013 in LULUCF was conducted only for the forest land, cropland, and grassland categories. In this sector, calculations were carried out using default values of emission factors (Tier I approach), which approximately comply with Georgia's climate conditions. The following carbon stock changes and CO₂ emissions/removals took place in 2010 to 2013 according to the inventory.

Table 10: Carbon stock changes and CO₂ emissions/removals in LULUCF sector in 2010-2013

Year	Forest Land		Cropland				Grassland (Hayfields and Pastures)		Net Emission/Removals	
			Annual Croplands		Perennial Woody Crops					
	Carbon stock net change Thousand tC	Gg CO ₂	Carbon stock net change Thousand tC	Gg CO ₂	Carbon stock net change Thousand tC	Gg CO ₂	Carbon stock net change Thousand tC	Gg CO ₂	Carbon stock net change Thousand tC	Gg CO ₂
2010	1,420	(5,207)	46	(170)	263	(963)	(674)	2,470	1 055	-3,870
2011	1,527	(5,597)	32	(118)	263	(963)	(674)	2,470	1148	-4,208
2012	1,491	(5,467)	31	(114)	263	(963)	(674)	2,470	1 111	-4,074
2013	1,501	(5,502)	35	(129)	263	(963)	(674)	2,470	1 125	-4,125

Source: MoENRP 2016

vision/goal, assessment of the current situation/ baseline, emission projections, mitigation potential and costs, vulnerability assessment, priority programs and policies, finance (existing, needs, and potential sources), and institutional arrangements. For additional information, the LEDS Global Partnership has several resources and references: http://ledsgp.org/?loclang=en_gb.

¹³⁰ IPCC 2003.

¹³¹ Note: This is the most comprehensive information on GHGs in Georgia, yet the areas of land use may vary from those discussed in Chapter 1 (which, for example, indicate closer to 40% Forest Land). Data should be interpreted with a degree of caution given data gaps, and variation in statistics.

The Table above shows almost equal dynamics of carbon accumulation from year to year with fluctuations between 1,055-1,148 thousand tons of carbon. According to this data, forests are the most important carbon sink in Georgia, removing an average of ~5,400 Gg CO₂ annually from 2010-2013.

The authors of the BUR, however, already state that “the lack of data is one of the key gaps in LULUCF sector, causing uncertainty over the GHG inventory to be high”. According to the BUR, fuel-wood extraction figures and forest resource assessment on target areas already indicate a significant reduction in forest biomass, which puts the available inventory data in certain doubts (see Chapter 5.1.3 for a detailed overview of forest information and inventory gaps).

For the period after 2013 to present the following key studies conducted in different areas of Georgian forests give additional insight into the problem at hand in the recent years:¹³²

- Forest canopy cover has reached critically low thresholds (less than 50%) in more than 55% of forest area across the country (see Chapter 5.1 for more detailed information on forest degradation dynamics).¹³³
- In Borjomi-Bakuriani forestry district (45,000 ha), the Austrian Federal Forests Enterprise¹³⁴ analysed changes in carbon stocks from two consecutive forest management inventories (1998 and 2014). Borjomi-Bakuriana Forest district lost nearly 20% above ground biomass (AGB) from 1998-2014.¹³⁵ Using the stock-difference method, they reported a net loss of 827,000 tC in the period 1998-2014 (i.e. 17% of the carbon stock in the district) over a period of 16 years. In the case of Borjomi-Bakuriani forestry district, this implies that on average over 1tC/ha were emitted annually as a result of forest degradation
- Chokhatauri Forest District experienced a net loss of 11.5% above ground biomass from 1988-2017 (400,000 tCO₂eq, equivalent to 11.5%).¹³⁶

The above-mentioned studies indicate that Georgian forests might already be considered as important net sources of carbon. Considering the data of the two forest areas (Borjomi-Bakuriani and Chokhatauri) carbon cycle calculations were made. The carbon accumulation in Georgia's forests is shown to be significantly reduced: on 17 tC/ha, from 99 tC/ha to 82 tC/ha in Borjomi-Bakuriani and on 7.3 tC/ha in Chokhatauri between 1998 and 2014. These figures place in doubt the results of the positive data of the GHG Inventory Report of Georgia (2006-2011). However, it should also be taken into account that both forestry districts cover only about 3.6 % of the country's total forest area.

The most recent assessment and calculation of the GHG emission baseline of the LULUCF sector was done by the LEDS authors in 2017.¹³⁷ The team used two approaches to determine the LULUCF baseline inventory for 2014: The first approach followed the methodology and assumptions used in the GHG National Inventory, submitted to the UNFCCC. The second used the same methodology, but the assumptions were based on more recent studies and Georgia's energy

¹³² E.g. MoEPA 2018, Patarkalashvili 2016; Akhalkatsi 2015, among others.

¹³³ World Bank 2015; Zeidler & Schachtschabel 2016.

¹³⁴ Österreichische Bundesforste 2015.

¹³⁵ Ibid.

¹³⁶ Sharabidze 2018.

¹³⁷ USAID 2017.

balance; where the large demand for fuelwood is accounted for with amounts based on fuelwood demand assessments. Calculations carried out under both approaches apply default values for emission factors and match these to climate conditions in Georgia. The following Table shows the total net GHG emissions for the LULUCF sector from 2013–2014, calculated with the two approaches mentioned above.

Table 11: Net GHG emission and absorption values from 2013-2014 LULUCF sector inventories using two approaches

Land Use	BUR (National Inventory) approach				Georgia LED Strategy Inventory approach (2014 only)	
	2013		2014		2014	
	C Emissions (000 tons)	CO ₂ absorption (Gg)	C Emissions (000 tons)	CO ₂ absorption (Gg)	C Emissions (000 tons)	CO ₂ absorption (Gg)
Forest Lands	1,301.0	-4,770.0	1,232.5	-4,518.5	746.5	-2,740.0
Ag Croplands	-225.0	-825.0	-499.2	-1,830.6	-501.8	-1,840.0
Ag Perennial crops	-253.0	-927.0	-230.2	-844.0	-242.7	-890.0
Grasslands	654.0	2,398.0	636.4	2,333.5	635.5	2,330.0
NET	1,125.0	-4,124.0	1,325.5	-4,859.6	-855.6	-3,137.3

Source: USAID, 2017

Using the assumptions specific to Georgia's LEDS, the recalculation of forest land emissions indicates that the absorption potential of Georgia's LULUCF sector decreased by 24% in 2014 and the overall absorption potential of the LULUCF relative to the total inventory was reduced to 20%. Hence, the overall absorption potential of the LULUCF relative to the total inventory reduced significantly. The authors of the LEDS argue that the LULUCF sector has decreased drastically in its carbon absorption potential since 1990, but still remains a net carbon-sink in 2015.¹³⁸ Forests remain the most important land category in the sector.

3.1.2 Future GHG emission projections

The most recent emission trends up to 2030 were calculated in 2017 in preparation of the Low Emission Development Strategy (LEDS), which is currently being developed by the Government of Georgia.¹³⁹ According to the Business as Usual (BAU) scenario calculated for the LEDS, GHG emissions will increase by 127 % to 28,690 Gg CO₂eq in 2030. Even under the LEDS scenario, emissions will increase by 33% (see Figure below).¹⁴⁰ When using the baseline estimation of the target region in this project and upscaling to the entire forest area in Georgia, emissions only from forest degradation due to loss of forest biomass would total 63,885 Gg CO₂eq for the period 2014 to 2030; this would lead to annual emissions of 3,758 Gg CO₂eq/ year. Comparing this to the emissions for forest lands in 2014 in the table above would mean an increase of 205%.

¹³⁸ USAID 2017.

¹³⁹ More information on Georgia's LEDS is available online: <https://www.ec-leds.org/milestones#milestone-node-451>.

¹⁴⁰ USAID 2017.

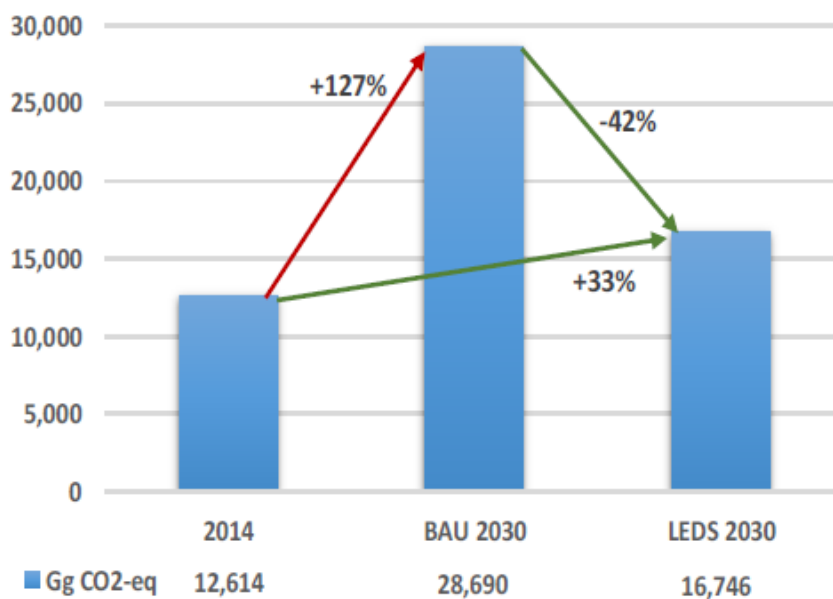


Figure 22: Business as Usual (BAU) 2030 and Low Emissions Development (LEDS) 2030 scenarios
Source: USAID 2017

Within the LULUCF sector, Georgia's LEDS further demonstrated an alarming trend: The projected annual absorption of CO₂ by the managed forests will decrease by five times between 1990 and 2030, and by 1.5 times between the years 2015 and 2030 (see Figure 23).¹⁴¹

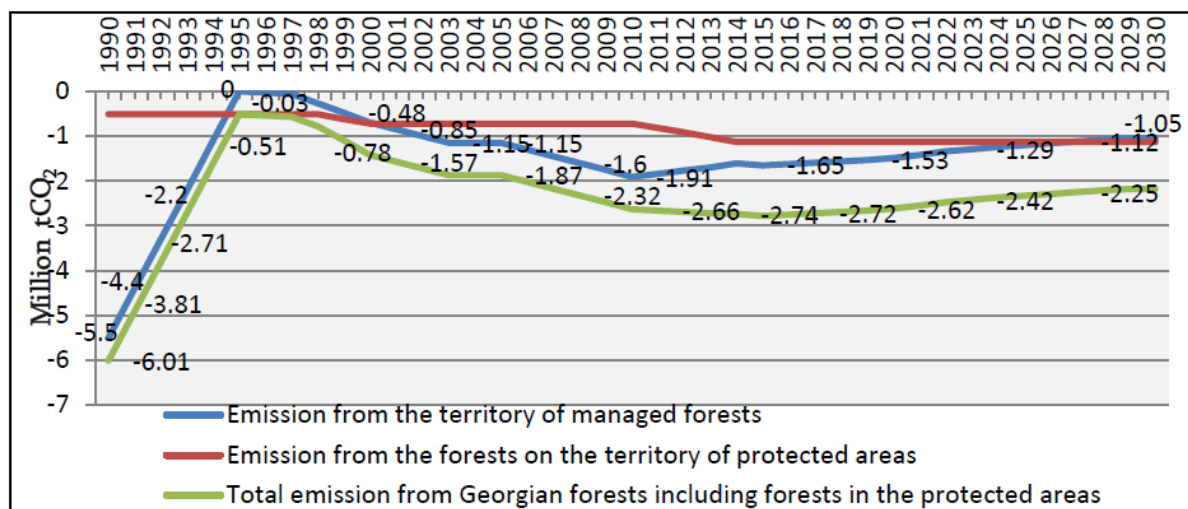


Figure 23: Trend in CO₂ absorption by Georgian forests from 1990-2030
Source: USAID 2017

The evidence for the trend of decreasing CO₂ absorption capacity of forests is supported by a (albeit not very recent) carbon accounting model developed for Georgia by Oloffson et al. (2010). The model quantified rates of land use changes and their effect on Georgia's carbon

¹⁴¹ USAID 2017.

budget at national level for 1990-2010, as well as future scenarios. The model shows that although the Georgian forests are currently a net carbon sink (about 0.3 Tg of carbon per year, corresponding to ~31% of the country's anthropogenic carbon emissions), their net absorption capacity is rapidly decreasing and they will remain as a sink only until about 2040 if the current rate of forest degradation persists (see Figure 24).

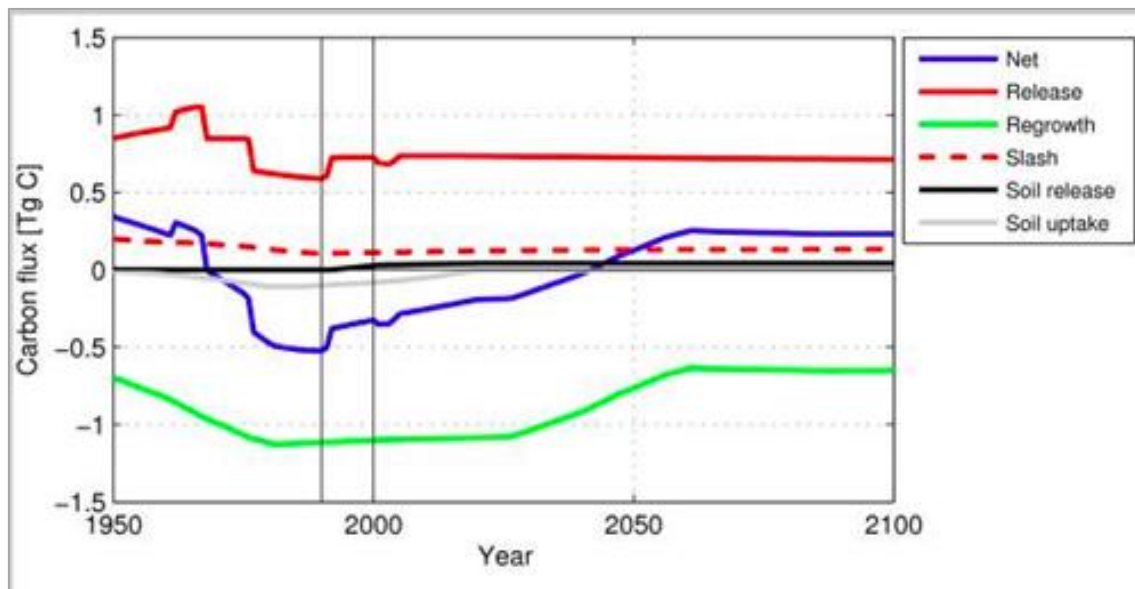


Figure 24: Georgia's carbon flux as an effect of land use change

Source: Oloffson et al (2010)

3.2 Climate change: risks and impacts

Due to its diverse topography, Georgia encompasses a variety of climatic zones, including the more humid areas of Western Georgia and the semi-arid and arid zones of Eastern Georgia, as described in greater detail in Chapter 1.3. The following sub-chapters look at past and current climatic trends, as well as projected future climatic changes.

3.2.1 Observed trends of climatic variables

Following global trends, the annual mean temperature has increased throughout Georgia. Climate change assessments conducted for the Third National Communication (TNC) indicate that throughout the last 50 years annual temperature has increased, with the maximum increase in East Georgia observed in Dedoplistskaro (0.70°C), Kakheti region and in West Georgia in Poti (0.60°C) between the periods of 1961-1985 and 1986-2010.¹⁴² The observations between these two periods show that the warming trend has been more intense in East Georgia, despite the average annual temperature being warmer in West Georgia. The variations in regional climate changes are due to physical-geographical features and landscape-climatic conditions. Additional observed climate trends also include increase in the number of hot days, especially in the low-lands.

¹⁴² Observations for the longer period of 1906-95 note temperature increase 0.1-0.5 °C in East Georgia and a decline in West Georgia by 0.1-0.5°C; Elizbarashvili et al. 2017; World Bank 2006.

Observations in precipitation also vary according to the regions: while there has been some increase in precipitation in the West (the mountain areas of Svaneti and Adjara between 5-14%),¹⁴³ there has been a slight decrease in large parts of East Georgia¹⁴⁴. In project target regions of Kakheti and Mtskheta-Mtianeti, there has been a slight increase in precipitation as well as decreases in some parts of Kakheti.

3.2.2 Projected changes in climatic variables

Overall, a 0.8°–1.4°C increase in temperatures by 2050 is projected.¹⁴⁵ The increasing trend in temperature is expected to continue for both East and West Georgia. The government of Georgia provided scenarios in the TNC for the periods of 2021-2050 and 2071-2100 using Regional Climate Model RegCM4.¹⁴⁶ According to the model, by 2050 temperature will increase by +1.6 and +1.7°C in the coastal zone and mountainous regions of Adjara; temperature increases up to +4.2°C are anticipated in the Batumi region¹⁴⁷. In the project target regions in East Georgia, temperature will increase between +1.1°C and +3.5°C in Kakheti, and +0.9°C and +3.2°C in Mtskheta-Mtianeti by the end of century (Table 12). In the future, more intensive increases in temperature are projected in West Georgia, with +2.1°C by 2050, and up to +4.2°C by 2100.¹⁴⁸

According to the forecast provided in TNC, trends of increase of precipitation are projected for West Georgia, with further precipitation decrease by 10-20% to reach an average of 2,100 mm for the entire territory.¹⁴⁹ Despite the varied precipitation prognosis, it is expected that seasonal rains will become unpredictable and intense.¹⁵⁰ Even though the prognosis predicts initially a slight increase by 2050, followed by a decrease in precipitation - this climate parameter needs to be treated with caution.¹⁵¹

Table 12: Past climate observations and future projections for project target regions

Observations/ Projections	Kakheti	Mtskheta-Mtianeti	Western Georgia
Temperature observations	0.5°C ¹⁵² annual increase ^A	0.5°C ¹⁵³ annual increase ^B	0.3°C ^c
Temperature projections 2050	+1.1°C ¹⁵⁴	+0.9°C by 2050 ^B	+2.1°C ^d
Temperature projections 2100	+3.5°C ^A	+3.2°C by 2100 ^B	+4.2°C ^d

¹⁴³ USAID 2017.

¹⁴⁴ Elizbarashvili et al. 2017.

¹⁴⁵ USAID 2017.

¹⁴⁶ MoENRP 2015.

¹⁴⁷ Ibid.

¹⁴⁸ GEO, UNDP and SDC 2018.

¹⁴⁹ MoENRP 2015.

¹⁵⁰ USAID 2017.

¹⁵¹ IPCC regional models also confirm uncertainty in regards to precipitation observations and projections. For more, see *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

¹⁵² Median value for two 25-year periods: 1961-1985 and 1986-2010.

¹⁵³ Median value for two 25-year periods: 1961-1985 and 1986-2010.

¹⁵⁴ The expected change scenarios for Kakheti region were assessed with the regional RegCM4 model, which uses ECHOM5 global model and the socio-economic development A1B scenario.

Observations/ Projections	Kakheti	Mtskheta-Mtianeti	Western Georgia
Precipitation observations	-4% ¹⁵⁵ (at 5 stations) ^A +5% (at 2 stations) ^A	+1.5%	+14% ^C
Precipitation projections 2050	±5% by 2050	+1.8%	n/a
Precipitation projections 2100	-10-20% by 2100 ^A	-14.0%	n/a

^A Source: UNDP Georgia 2014; ^B Source: TNC; ^C Source: USAID 2017; ^D Source: GEO et al. 2018

3.2.3 Climate-related hazards and trends

Georgia is prone to climate-related hazards and natural disasters, and is considered to have a high risk of river flooding, landslides, extreme heat, wildfires,¹⁵⁶ and flooding (Figure 25).¹⁵⁷ The level of predisposition and the risk of natural disasters varies across regions with higher concentration in the mountains and forested regions.¹⁵⁸ Such natural disasters cause damages to ecosystems, livelihoods, infrastructure, agriculture, and other natural assets.

The Third National Communication to UNFCCC further notes that climate-related-hazards and natural disasters have become more frequent and severe, such as flooding, landslides, mudflows, and droughts, among others.¹⁵⁹ In more degraded areas with lower vegetation cover, flooding and landslides could increase with climate change, based on the projected changes in temperature and precipitation. Studies on climate change in Georgia further project that forest fires will increase in number and scale due to climate change.¹⁶⁰ The project's target regions of Guria, Kakheti and Mtskheta-Mtianeti, have a high and medium risk of flooding, which is projected to increase in the future with climate change.¹⁶¹ The risk of drought will also increase, particularly in the region of Kakheti, which contains some areas that are already experiencing desertification.¹⁶²

¹⁵⁵ Median value for two 25-year periods: 1961-1985 and 1986-2010.

¹⁵⁶ Wildfires are often caused by farmers, due to the burning of crop residues – which often get out of control during the dry season. Coniferous forests are more at risk than deciduous forests.

¹⁵⁷ ThinkHazard! Tool 2019.

¹⁵⁸ World Bank 2018b.

¹⁵⁹ MoENRP 2015.

¹⁶⁰ USAID 2016.

¹⁶¹ UNDP 2018.

¹⁶² Ibid.

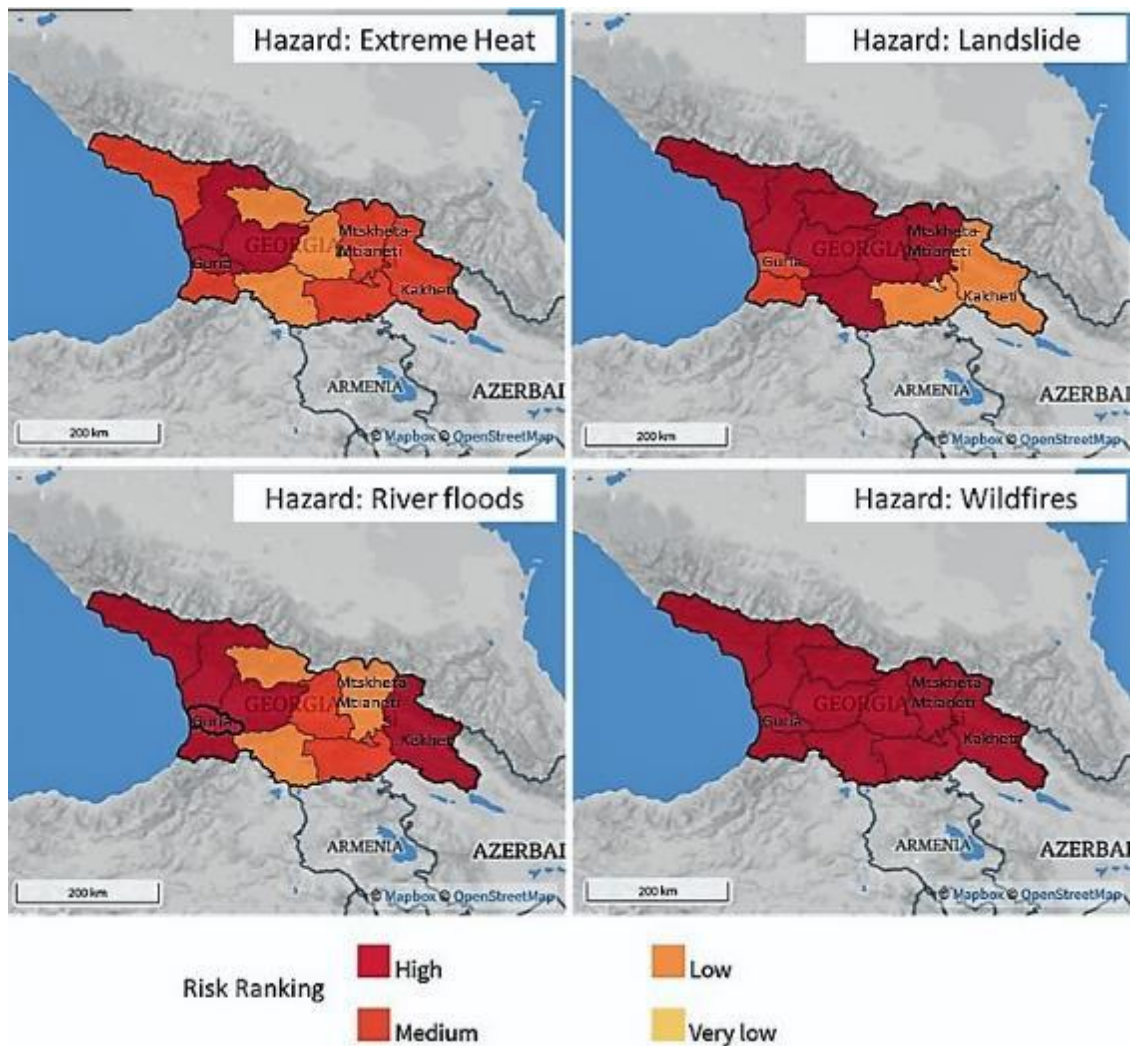


Figure 25: Regional distribution of hazard risks for certain hazards ranked as 'high' and 'medium' risk in Georgia (extreme heat, landslides, river floods, and wildfires)

Source: WB ThinkHazard! Tool

3.2.4 Climate risks and impacts on forest ecosystems

Available studies on the vulnerability of Georgian forests and risks posed by climate change are scarce. There is an information base on observed climate trends and projections, such as increasing temperature and variability of precipitation patterns. However, analyses on how these trends specifically affect forest ecosystems and their functions in Georgia lack comprehensive and evidence-based research, which could support further planning of actions to increase the resilience of forest ecosystems.¹⁶³

To inform the elaboration of Georgia's TNC, the vulnerability of forest systems to climate change, and suitable adaptation measures were assessed for three regions in Western Georgia (Adjara, Upper Svaneti and Borjomi-Bakuriani) confirming the general trends; however there remains a notable gap in information on climate risks and adaptation strategies for forests in

¹⁶³ GEO et al. 2018.

Eastern Georgia. Besides, WWF on behalf of the German Ministry for Economic Cooperation carried out an assessment of adaptation strategies for different forest ecosystems in Batumi, Adjara, in 2018. According to the analysis, almost all forest types will suffer from severe summer drought, risks of fire and landslides on steep slopes towards the end of the century.

Below is the overview of available analysis on climate risks on forests for West and East Georgia. Available studies and assessments are limited to Western Georgia and there is a limited information base for Eastern Georgia. The main factors that lead to the climate risks in East and West Georgia are summarized below, based on available literature and stakeholder consultations:

Climate change impacts in West Georgia (Figure 26)

Known climate change risks and impacts on forest ecosystems in Western Georgia is based on assessments from forested areas in Adjara, Upper Svaneti and Borjomi-Bakuriani.¹⁶⁴ The main climate signal is increased temperature, which has resulted in various impacts to the forest ecosystems:

- Spread of plant pests and diseases in Adjara¹⁶⁵; and Borjomi-Bakuriani¹⁶⁶
 - Of phytopathological diseases, chestnut endotic cancer is the most widespread in the relatively low zone of the region, while the great spruce bark beetle (*Dendroctonus micans*) dominate the higher parts of the region. In addition, new plant pests such as horse-chestnut leaf miner (*Cameraria ohridella* Deschka), trumpet leaf miner (*Tischeria complanella* Hb), oak leaf mining moth (*Tischeria ekebladella* Bjerkande), and boxwood blight (*Cylindrocladium buxicola*) emerged in period 2006-2011. These diseases result in forest degradation, with varied impacts such as leaf fall, and in severe cases tree dieback, among others. The prevalence of such pests also leads to economic impacts, including unsalvaged timber, the cost of implementing control measures, and reduction of timber quality.
- Altitudinal shift of boreal forests (specifically birch forest boundaries) to higher altitudes in Upper Svaneti due to more favorable conditions in the alpine zone
 - Abiotic and biotic changes are not observed in forests of Upper Svaneti, substitution of species rather takes place. In past, when glaciers started to recede in southern parts of Upper Svaneti, boreal forest species (pine and birch) gradually occupied places formerly covered by glaciers. As a result of climate change the area of pine and birch forests has declined significantly due to increasing temperature, and increasingly unfavorable growing conditions. While these species are not yet fully substituted by more shade-tolerant and respectively stronger defector species (beech, spruce and fir), they have been increasingly replaced by these species due to the increasingly unfavorable growing conditions as a result of climate change.
- Increased in fire hazard in Borjomi-Bakuriani, linked with increasing temperatures and dry conditions¹⁶⁷

¹⁶⁴ All of these three regions are located in West Georgia.

¹⁶⁵ MoENRP 2015.

¹⁶⁶ USAID 2016; Note pests and diseases are discussed in greater detail within Chapter 5.1.2 with a focus on forest degradation nationally, and within the project area.

¹⁶⁷ MoENRP 2015; USAID 2016; In 2008 in Borjomi-Bakuriani over 950 ha of forests were damaged due to forest fires, an additional 250 ha completely destroyed. In 2017, 101 ha of forest plantations were destroyed in the same region.

- Abiotic and biotic disorders are clearly manifested in Borjomi – Bakuriani forest ecosystem; in particular increase of the incidence of fires is observed (in 2003 two incidences of forest fire were recorded, while from 2006 to 2015 there were at least 3 to 6 almost every year), and from biotic disorders systematic intensification of pest diseases was observed.¹⁶⁸ Despite a net increase in annual precipitation, precipitation decreased in spring and summer (e.g. spring by 5 mm, -3%, and summer by 27 mm, -14%). Thus, an increased risk in forest fire is linked with declining seasonal precipitation, and increasing temperatures – establishing increasingly hot and dry conditions.

Climate change impacts in East Georgia (Figure 27)

There are no available studies on the risk and vulnerability of forests in Eastern Georgia to climate change. Available vulnerability studies on East Georgia are specific to the agriculture sector, and do not focusing explicitly on forestry. However, from these studies potential risks and impacts also relevant for the forestry sector have been identified. Akhalkatsi (2015) notes that arid and semi-arid habitats, those found in Eastern Georgia, are particularly sensitive due to warming since they are affected by temperature extremes. Climate vulnerability studies on East Georgia have identified the municipality of Dedoplistskaro¹⁶⁹ as one of the most vulnerable areas in Georgia.¹⁷⁰ Dedoplistskaro is one of the driest and most arid regions of East Georgia, is prone to prolonged droughts, and there is evidence of land degradation and desertification occurring.

¹⁷¹ An energy crisis occurred in the 1990s, which led to cutting down trees (agricultural wind-break trees) to use as fuelwood in Dedoplistskaro, increasing the exposure of the agricultural sector to climate hazards as the trees played an important role in protecting soils from wind erosion. Overgrazing in Dedoplistskaro has led to decreased soil fertility in the district,¹⁷² which was aggravated with prolonged droughts¹⁷³ increasing the risk of desertification.

Due to the diversity of agro-climatic zones in Georgia and distribution of tree varieties, it is challenging to draw definitive conclusions on forests' vulnerability in Eastern Georgia. Based on assumptions derived from the above studies in Dedoplistskaro and Akhmeta municipality, and from stakeholder consultations conducted during project development, it is likely that climate change leads to the following impacts on forests in Eastern Georgia:

- Increasing temperatures and changes in seasonal precipitation observed in Eastern Georgia and projected in the future, particularly in the dry summer season, will likely lead to prolonged droughts that can reduce tree's productivity and growth, and alter species composition. This will further alter the provision and quality of forest ecosystem services, affecting, for instance, forests' soil protection and carbon storage capacities. It will also increase the likelihood and severity of forest fires,¹⁷⁴ particularly in Kakheti which is one of the most arid regions in the country.

¹⁶⁸ Georgia's Third National Communication to the UNFCCC.

¹⁶⁹ The municipality of Dedoplistskaro is located in the region of Kakheti and is one of the project forest districts.

¹⁷⁰ MoENRP 2015, Rukhadze et al. 2014, USAID 2016.

¹⁷¹ Rukhadze et al. 2014.

¹⁷² The composition of humus in Shiraki black soil decreased from 7.5% in 1983 to 3.2% in 2006.

¹⁷³ Rukhadze et al. 2014.

¹⁷⁴ Most forest fires start in agricultural areas, especially in Eastern Georgia. For example, within Dedoplistskaro huge areas of wheat fields are burned after harvesting. In dry periods these fires easily get out of control.

- Climate change is also likely to result in an increase of new and existing pests and diseases that can cause damage to trees (incl. loss of biomass, or in severe cases tree dieback). Pests such as boxwood blight are present in Eastern Georgia but have been less impacted than forests in Western Georgia. Mtskheta-Mtianeti has seen the emergence of bark beetles, which could become increasingly prominent with climate change – especially as trees become weakened due to changes in the climate that affect their growing conditions.

It is recommended that climate risk and vulnerability studies are conducted for forests in Eastern Georgia, as there is a major information gap in understanding the risks posed based on the district climatic and bio-geophysical characteristics of Georgia, as well as suitable adaptation strategies to inform resilient forest planning, management, and monitoring.

Summary of climate impacts in Georgia and implications for exposure, vulnerability, and risk

In summary, increasing temperature and changes in precipitation patterns have had direct impacts on forests in Western and Eastern Georgia.¹⁷⁵ Direct impacts include increasing risk of fire, landslides, floods, pest and disease outbreaks, droughts, and changing species composition. As a result of these impacts, forest ecosystem services such as the soil protection and carbon storage functions, among others, may be weakened if suitable adaptation strategies are not adapted.

When focusing on the concept of exposure, there are 2.69 million ha of forests in Georgia, covering just under 40% of Georgia's total land area. Thus, exposure to climate change in forest ecosystems is considered quite high given the extensive forest coverage in the country. Forests in Western and Eastern Georgia are both exposed. When focusing on forests under NFA management and management of the Adjara Forest Agency¹⁷⁶, forests in Western Georgia cover 1,048,000 ha and forests in Eastern Georgia cover 978,800 ha.¹⁷⁷

It is clear from the above assessment that there are climate risks, however the severity of the risk and suitable strategies need to be further investigated at the regional and/or district level. In terms of vulnerability, little is known about the vulnerability of at least 2,329,593 ha of forests in Georgia.¹⁷⁸ With limited assessments of forests' vulnerability, including sensitivity and capacities, it is difficult to draw conclusions for forested regions with different conditions, further exacerbated by a lack of information on forest structure/ composition.

In addition, current forest practices increase the vulnerability of Georgian forests to climate change. On the one hand unsustainable forest utilization leads to forest degradation, which in turn exacerbates the vulnerability of forest areas to climate change.¹⁷⁹ These factors not only contribute to forest degradation, but have a major impact on the overall ecosystem's resilience

¹⁷⁶ Detailed region-level information was not available for forest areas under the Agency of Protected Areas.

¹⁷⁷ GEOSTAT 2019e; Eastern Georgia figure includes NFA forest fund area in Samtskhe-Javakheti, Shida Kartli, Kvemo Kartli, Mtskheta-Mtianeti, and Kakheti. The figure for Western Georgia includes the NFA forest area for Guria, Imereti, Racha-Lechkhumi and Kvemo Svaneti, Samegrelo-Zemo Svaneti, Samegrelo-Zemo Svaneti, as well as the forest area under the Forest Agency of Adjara.

¹⁷⁸ Calculated using the forest area of Adjara (141,800 ha), Borjomi (45,000 ha). The area of forest assessed in Upper Svaneti was not available, however another report found that the total area of Upper Svaneti is 173,607ha (Upper Svaneti Protected Area Management Plan), and due to the lack of information this value was used (even though it likely over-estimates the forested area). The figure was then calculated by the areas from the three studies from the total forest area in Georgia (2.69 million ha, incl. Abkhazia AR).

¹⁷⁹ FAO 2010.

to climate change and the provision of key ecosystem services provided by forest ecosystems, including, but not limited to, reduced carbon sequestration in forests.

Based on the above discussion, the following two figures summarize the climate impact chain for forests in Western and Eastern Georgia.

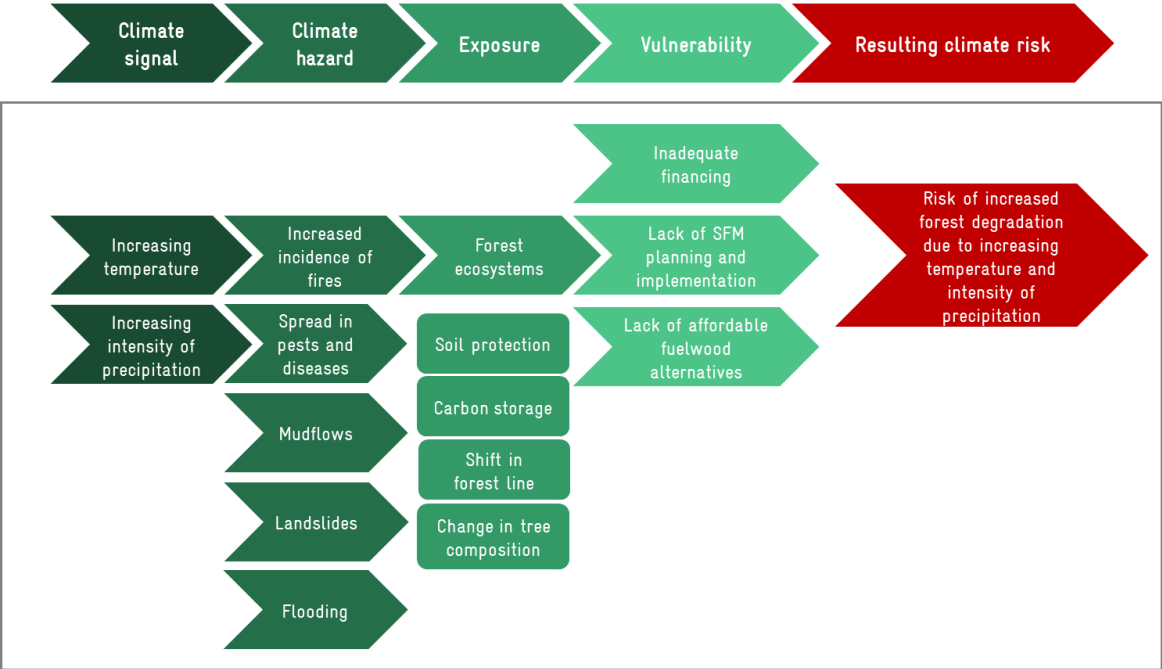


Figure 26: Impact chain for the increased forest degradation due to climate change (West Georgia)

Note: Based on the IPCC's AR5 Concept of Climate Risk

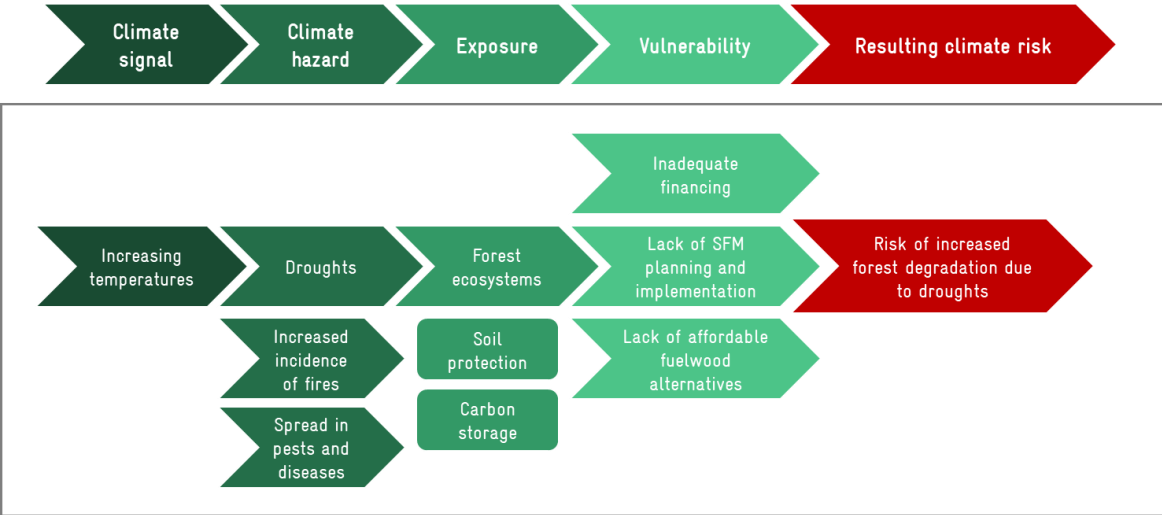


Figure 27: Impact chain for the increased forest degradation due to climate change (Central and East Georgia)

Note: Based on the IPCC's AR5 Concept of Climate Risk

Info Box 5: Responding to climate risk and vulnerability in forest ecosystems in Adjara

Forests in Adjara provide diverse ecosystem services including timber, fuelwood, non-timber forest products, recreation, tourism, carbon storage and the regulation of natural hazards (e.g. landslides and flooding), among others.¹⁸⁰ Brander et al. (2016) assessed the value of annual ecosystem services from Adjara forests under conditions of i) increasing degradation, and ii) restoration. They found that under the degradation scenario by 2035 there would be an annual loss in welfare of nearly USD \$1.3 million, whereas under the restoration scenario the annual welfare gain would be USD \$300,000. Whilst the calculation of ecosystem services is complex and data gaps persist, the study demonstrated the importance of reversing forest degradation and supporting forest restoration.

In the vulnerability assessment of Adjara forests, the impacts of increased temperature and precipitation on the region's forests were identified (based on forest type, elevation and time scale). Observed impacts included the emergence and spread of diseases of trees, the disappearance of forests in the sub-alpine zone due to changing climatic conditions, lowering of upper levels of forests by 300-400 meters due to erosion caused by intensive rains and deep snow cover, as well as increased risk of forest fires due to seasonal declines in precipitation and increasing temperatures.

In response to climate risks faced by forest ecosystems in Adjara, an adaptation strategy was drafted, which aims to strengthen the resilience of forest ecosystems in this region. The strategy revolves around close-to-nature forestry based on:¹⁸¹

- adaptive management,
- maintaining and increasing diversity,
- managing for stability and resilience,
- managing for multiple functions, and
- developing effective forest protection approaches.

Measures are targeted to forest types and conditions to ensure their suitability and effectiveness in increasing the resilience of these ecosystems based on the site-specific conditions (forest type, altitude, climate risks faced, among others).

Info Box 6: Implications for the project design

Currently Georgia is lacking comprehensive and evidence-based research on the vulnerability of forest ecosystems to climate change, which could support further planning of actions to increase the resilience of forest ecosystems. There are studies on climate change observations and future projections for the project target regions that confirm continuation of increasing temperature.

Lack of information on density and distribution of types of trees make it difficult to assess the likely impact of climate change on different forest stands. Some impacts of climate change on forests (mostly in West Georgia) are already being observed such as increased occurrence pests

¹⁸⁰ Brander et al. 2016.

¹⁸¹ Stritih and Stritih 2018.

and diseases, shift in forest line, and increased fire hazard. Different forest types, climate conditions and other localized conditions require regional level climate risk and vulnerability forest assessments.

Through planning and implementing SFM, in particular ecosystem-based forest management, in target regions, one of the adaptation co-benefits of the project will be assessing forests' vulnerability, and integrating the results into management plans, trainings, protocols and to streamline the results into policy making. Management-level Criteria and Indicators for Ecosystem-based Management (described in detail in Chapter 5.2), will support natural adaptation processes.

The ongoing GCF project "Scaling-up Multi-Hazard Early Warning System and the Use of Climate Information in Georgia" implemented by UNDP aims at strengthening the climate adaptation capacities in Georgia through developing a system for multi-hazard risk knowledge for effective climate risk management. It focuses on the following hazards: floods, landslides, mudflows, avalanches, hailstorms and droughts. The standardized and harmonized national multi-hazard mapping and risk assessment methodology will provide synergies for the proposed forestry GCF project, informing climate vulnerability and risk in the target regions/ districts.

3.3 National climate goals and priorities

The Government of Georgia is fully committed to addressing climate change. The country is a party to the United Nations Framework Convention on Climate Change (UNFCCC), and ratified the Paris Agreement, as well as the Kyoto Protocol. It is further a Party to the Convention on Biological Diversity (CBD) and the United Nations Conventions to Combat Desertification (UNCCD). Together with the country's legal, regulatory and policy framework, these conventions provide a framework to work on a wide spectrum of issues related to climate change.

Below is an overview of key documents that outline national climate change mitigation and adaptation goals and priorities of Georgia. The project will contribute to the achievement of these goals.

Nationally Determined Contribution (NDC) to the UNFCCC¹⁸²

The government of Georgia commits to reduce its GHG emissions by 15% below the Business as usual scenario (BAU) for the year 2030 in its NDC submission to the UNFCCC. The committed mitigation target is a 34% reduction in emission intensity per unit of GDP from 2013 to 2030. The conditional reduction target is up to 25% which is equivalent to 43% of emission intensity per unit of GDP from 2013-2030.

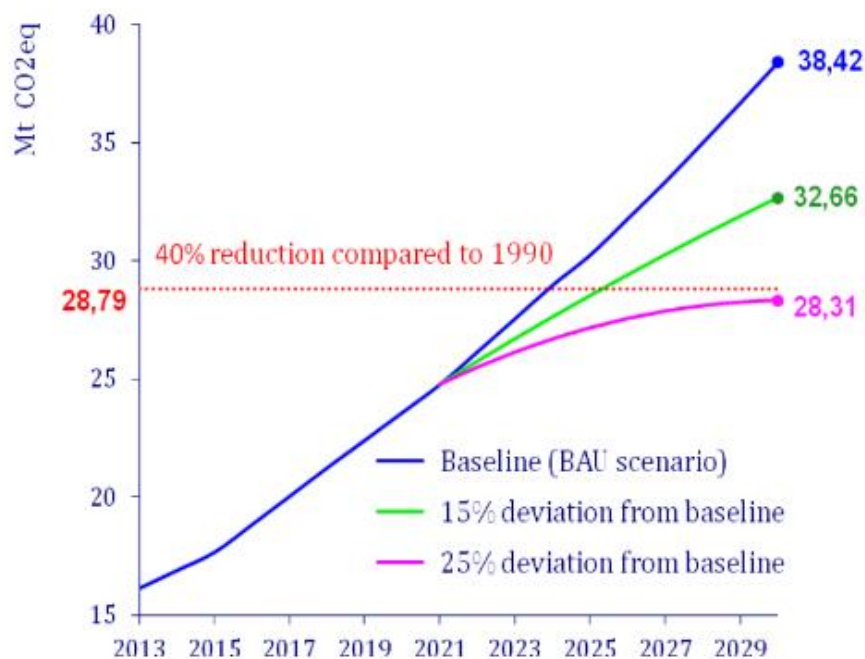


Figure 28: GHG reduction targets of Georgia in the NDC

Source: GoG 2015

Georgia's NDC singled out forests as the key sector for national climate actions and the only one with quantified unconditional and conditional commitments. By strengthening law enforcement and introducing SFM practices, it is estimated to reduce an overall emission of at least 1 million tCO₂eq over period of 10 years on 45,000 hectares (unconditional), and up to 6 million tCO₂eq on 250,000 ha of forest lands (conditionally) over a period of 2020-2030.

¹⁸² Government of Georgia 2015.

In the ongoing update of the NDC the government plans to rise the ambitions in the forest sector: It is envisaged to increase the carbon sink capacity of the forest sector by 10% and to increase the forest area under SFM to 436,000ha by 2030. This rise in ambition is a direct consequence of this GCF proposal, since expected project results were taken into account.

National Adaptation Plan¹⁸³

The National Adaptation Plan is currently being prepared with the support of UNDP in order to advance further the implementation of adaptation actions. The main objective of the Government of Georgia is to improve the country's preparedness and adaptive capacity by developing climate resilient practices that reduce the vulnerability of particularly exposed communities.¹⁸⁴ In order to reach this objective, Georgia is integrating climate risk and resilience into core development planning and implementation with the forestry sector and forest ecosystems playing an important role.¹⁸⁵ The NAP is at the planning phase. At this stage, the forestry sector is ranked as one of the priority areas.

The Fourth National Communication to the UNFCCC¹⁸⁶

Georgia is in the process of preparation of the Fourth National Communication. The program will cover the main impacts of climate change on major sectors of the economy including the assessment of vulnerability of Georgia's forests and identification of adaptation priorities. The project target regions of Guria, Kakheti and Mtskheta-Mtianeti are included are priority regions in the Fourth National Communication.

Low-Emission Development Strategy (LEDS)¹⁸⁷

Georgia's Low Emission Development Strategy has been prepared by USAID in 2017 and awaits government approval. The purpose of the Georgia Low Emissions Development (LED) Strategy is to ensure a low emissions transition and sustainable path for Georgia's economic and social development. The pathway encompasses identifying main sources and sectors of emissions and their trends in the development process; assessing and removing barriers to low emission development; defining goals, policies and measures within each sector in the context of sustainable development of the country; establishing a relevant legislation system, infrastructure and coordination process for implementation; monitoring results; and mobilizing national and international financial sources for implementation of Georgia's LED Strategy (USAID, 2017).

In course of preparing the document, the team conducted extensive research and calculations in the energy efficiency and LULUCF sector. Many of the finding also informed this feasibility study. Apart from the most recent baseline analysis in both sectors, the following proposed targets and measures of the LEDs are relevant for this project:

Building sector:

- 40% of the existing residential buildings are completely renovated
- 80% of new biomass heating stoves in rural households are efficient biomass stoves
- 30% of all new water heaters in households are solar water heaters

¹⁸³ Stakeholder interviews, February 2019, Tbilisi, Georgia.

¹⁸⁴ MoENRP 2016.

¹⁸⁵ MoENRP 2015.

¹⁸⁶ Stakeholder interviews, April 2019, Tbilisi, Georgia.

¹⁸⁷ USAID and Winrock 2017.

LULUCF sector:

- Introduction of sustainable forest management for 295,000 ha
- Illegal felling reduced by at least 50%

The Third National Environmental Action Programme for 2017-2021 (NEAP-3)¹⁸⁸

The Program covers climate change as one of the main environmental issues. Within the climate change field, the main vulnerabilities are identified as follows: impact on natural ecosystems; forest and land degradation; decreased forest productivity due to forest fires, pests and diseases; desertification; glacier melting; decreasing soil fertility, water resources and increasing frequency of natural hazards.

The Program identified long-term goal 2030 for the forestry sector in Georgia, acknowledging the importance of forests for both climate change adaptation and mitigation:

- To improve the overall condition and ecological functions of forests through establishment of a sustainable forest management system in Georgia.

Targets for 5-years are set in order to achieve the goal:

- Target 1: Improvement of legal framework and implementation of the Sustainable Forest Management system.
- Target 2: Reduction of pressure on forests through promoting the use of alternative fuel sources and the improvement of qualitative and quantitative characteristics of forests.
- Target 3: Capacity building for forest policy development, management and control entities.
- Target 4: Promotion of the use of forest ecosystem services.
- Target 5: Promoting development of forest education and public awareness.

Nationally Appropriate Mitigation Actions (NAMAs)

In recent years, Nationally Appropriate Mitigation Action (NAMA) has become a key element of negotiation on mitigation in the UNFCCC process. Georgia is actively involved in preparation and implementation of projects for NAMAs. In the framework of this initiative the following NAMAs are implemented or are under preparation:

- Efficient use of biomass for equitable, climate-proof and sustainable rural development (2016-2021) – NAMA seeking financial support for implementation. The objective of this NAMA is to contribute to transformational change in the energy supply of rural areas, aiming for efficient use of biomass through the use and up-scaling of solar water heaters, efficient wood stoves, energy efficient insulation measures in rural households and sustainable forest management
- Energy efficient refurbishment in the Georgian public building sector – NAMA seeking support for implementation.

3.4 Summary of climate problem

Annual emission rates are strongly connected to the economic performance of Georgia and since 1995, at a time of economic recovery, emissions started to increase. In 2014, Georgia's GHG emissions have reached 12,600 gG CO₂eq and most recent calculations for 2015 estimate that

¹⁸⁸ MoENRP 2018.

more than 15,000 gG CO₂eq have been surpassed. Based on the current growth rates, GHG emissions are expected to continue rising until 2030. Land use, land-use change and forestry (LU-LUCF) is one of the most significant sectors in Georgia's GHG emission profile. Georgia's forests, covering approximately 40% of the total territory, play a pivotal role in regulating net GHG emissions of Georgia serving as a net carbon sink, which corresponds to 31% of Georgia's anthropogenic carbon emissions. Forests' sink potential is critical in securing net removal of forecasted GHG emissions for the period 2020-2030 and beyond. Without a reversal in the forest degradation trends that limit forests' carbon absorption capacity, Georgia's forests may cease to be a carbon sink.¹⁸⁹

Forests are critical for socio-economic development in Georgia, especially for the rural population who depends on forests for fuelwood, timber and non-timber forest resources. They are also of importance for other sectors such as hydropower, agriculture and tourism where *"the protection of forests and introduction of rational practices for their use will significantly improve the population's socio-economic standing"*.¹⁹⁰ However, the unsustainable use of forest resources, primarily for fuelwood – the main source of energy in rural areas, has resulted in over-harvesting and the resulting degradation of Georgia's forest resources. Fuelwood demand exceeds sustainable harvesting levels, considering the extensive forest degradation and reduced productivity of many forests in the country (described in detail in Chapter 5 below). As the result of ongoing degradation, the capacity of Georgian forests to provide goods and services has declined, most notably the carbon capturing potential but also forest ecosystem's ability to adapt to climate change.¹⁹¹

Without action, the degradation of Georgian forests will continue to prevail under business as usual practices. There is a need to promote the transition to sustainable forest management based on ecological, social and economic principles considering ecosystem-based forest management of Georgia's forest resources, while simultaneously promoting the adoption of energy efficient technologies and alternative fuels to reduce the rural population's reliance on fuelwood. Such practices, as referenced in the country's national climate goals, commitments, policies and strategies, will reduce forest degradation and enhance forest carbon stocks, strengthening the sink potential of Georgia's forests to regulate net GHG emissions. It further can generate numerous sustainable development benefits.

¹⁸⁹ Note: without detailed forest inventories and information there is high uncertainty about the specific rates of degradation. Nonetheless, forest degradation is considered to be widespread and persistent, and poses a threat for forests' carbon capturing potential. See Chapter 5.1 for more detailed information on forest degradation.

¹⁹⁰ Social-economic Development Strategy of Georgia 2020.

¹⁹¹ In 2014, the forest resources assessment of the area - Borjomi-Bakuriani Forest District showed the reduction in forest biomass by almost 20% over the past 15 years.

4 PROJECT TARGET REGIONS

While Georgia aims to implement SFM nation-wide, a phased approach is needed for the gradual uptake of sustainable forest management planning and management practices as stipulated under the new forest code. There are 1.89 million ha of forested land under NFA-management alone, which represents an ambitious target - comprising 2/3 of the country's forests (total 2.69 million)-¹⁹² due to limited technical capacities in the country, in both the public and private sector. Building up capacity for both the public and private sector will take time as they need to hire additional staff and personnel, train staff (new and existing) on SFM and best practices.

Thus, a phased approach is needed to not overburden public and private sector actors, to enable the gradual implementation and scaling up of SFM, aligned with gradually strengthening capacities in the sector. Once an enabling environment and the necessary capacities are established, scaling up SFM will be possible at a faster rate. This applies for not only NFA, but also institutions such as DES who must strengthen their capacities and effectiveness to support SFM implementation through effective forest supervision.

4.1 Selection of project target regions

As a result, it was decided to focus on 2-3 target regions for the implementation of the project, that will serve as a model for the implementation of SFM, which can be scaled up to the rest of the country. A multi-criteria assessment was conducted to assess potential target regions for inclusion in the project. The results from this assessment were presented and validated during a workshop with key partners on December 6, 2018. Key criteria assessed include (see Appendix 4 for more detailed information on the selection of target regions):

- Political priority regions (as mentioned in national key documents such as NDC, LEDS, National Communications, etc.)
- Climate change mitigation potential from sustainable forest management / improved fuelwood management (taking also into consideration forest productivity and cost/benefit ratio)¹⁹³
- Demand for fuelwood / vulnerability of the rural population also in view of potential future degradation (density of poor rural population)¹⁹⁴
- Economic potential for creating financial revenues from SFM
- Synergies with other projects
- Data availability (quality and coverage of forest data) – NFI and forest management inventory schedule
- Potential for attracting co-financing.

¹⁹² GEOSTAT, in total the country has a "forest area" of 3.12 million ha, however only 2.69 million ha are actually covered by forests. Thus, this statistic only focuses on the area of existing forest.

¹⁹³ For example: a) Regions characterized by forests with high carbon density and low degradation should be rated as low; b) Regions characterized by highly degraded forests with low growth rates should also be rated as low; c) regions characterized by high forest degradation but high potential to recover should be rated as high.

¹⁹⁴ Explanation: Regions with relatively intact forests containing high value timber species on the one hand but increasing pressure due to high density of rural (poor) population should be rated as high.

Guria, Kakheti, and Mtskheta-Mtianeti were selected as the project's three target regions, presenting a balance of forests in Western and Eastern Georgia (see Figure 29). NFA managed Forests in these regions covers a total of 624,800 ha, of which 586,100 ha are covered by forest (equivalent to 22% of Georgia's forests, or 31% of NFA managed forests¹⁹⁵). All three target regions are included in the upcoming Fourth National Communication of the UNFCCC, with a noted focus on forest vulnerability assessments for these regions.

Table 13: NFA forest areas within the selected project regions¹⁹⁶

Region	Forest area and forest land under NFA management (ha)	Forest area of which is covered by forest (ha)
Guria	85,900	82,500
Kakheti	288,400	268,200
Mtskheta-Mtianeti	250,500	235,400
<i>Total (3 regions)</i>	<i>624,800</i>	<i>586,100</i>

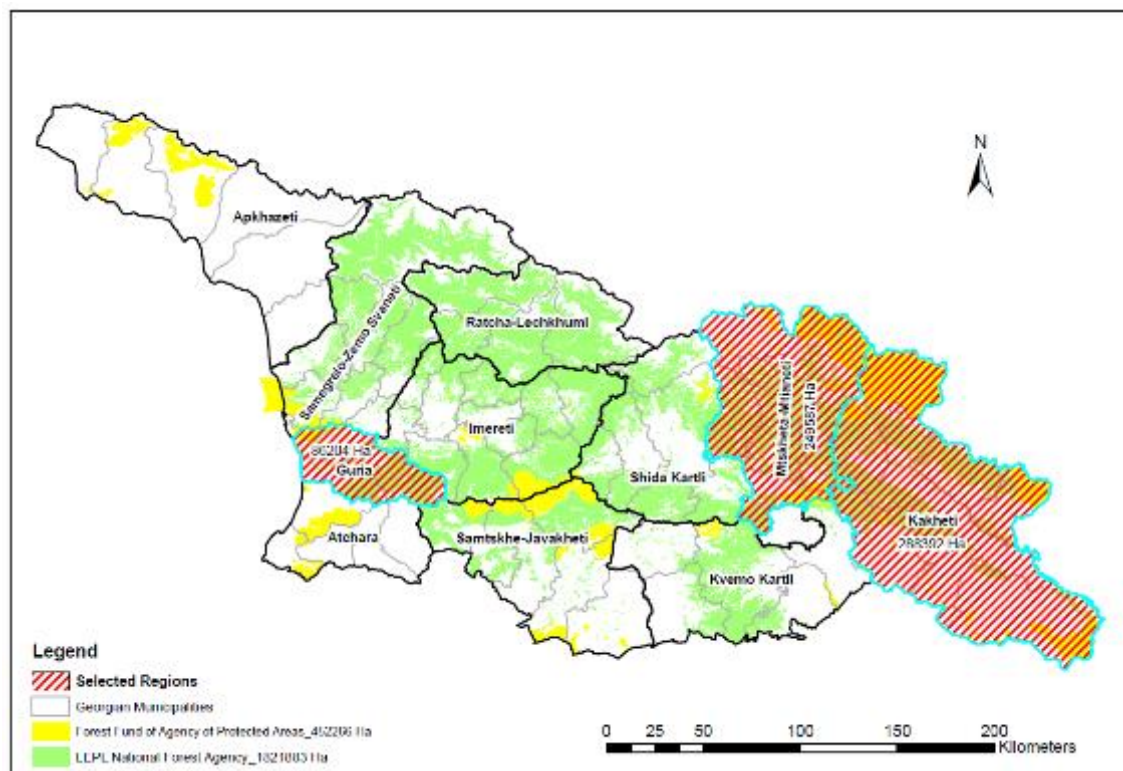


Figure 29: Map of target regions

¹⁹⁵ The area actually covered by forest. If considering the full NFA managed forest area (incl. areas with and without forests) the total would be 29%.

¹⁹⁶ Data should be interpreted with caution, as discussed in Chapters 1.3 and 1.4 due to variation in statistics. GEOSTAT data was used to ensure the use of a consistent dataset, as it is the most comprehensive data at the district and regional level.

4.2 Selection of target districts within selected project regions

For the selection of target districts within the three project regions, an additional set of criteria was developed. The selection process combined quantitative and qualitative parameters as described below.

Overall requirements for selection of districts: The selection process and the multi-criteria analysis was framed by the overall requirements of the project to:

- Implement sustainable forest management on a total area of at least 250,000 ha (NDC conditional target)
- Selection of districts and their forest areas should cover most dominant forest formations, altitudinal, climatic gradients and anthropogenic conditions (urban centers, rural areas) in order to serve as representative model implementation with a clear up-scaling potential from the three project regions to a future nation-wide implementation
- Ideally where FMP planning is underway or near completion to also have ‘low hanging fruits’ with early implementation of measures in the project compared to other districts where new FMPs have to be developed from the beginning. This would allow for a phased approach within the project.

Available information and data to establish a set of criteria: The following datasets and information were used to set up the set of criteria which then were used to perform a multi-criterion rating leading to a transparent ranking of the districts in terms of their priority for selection:

- Sets of spatial data:
 - Global Forest Watch Dataset (Hansen et al 2018) to perform a district level forest cover change assessment 2007 – 2017 and to identify forest areas with dense, medium dense and open forest conditions
 - National spatial layer of districts
 - National spatial layer of roads (main roads, other roads)
 - Spatial layer of settlements
 - Digital elevation model to identify altitudinal ranges
- National statistics (GEOSTAT) on district specific fuelwood consumption and demand
- Forest statistics from NFA with overall forest area statistics
- In addition to the quantitative data, an expert rating was performed during the consultations to separately rate each of the districts in terms of the forest productivity (high, medium, low), the overall accessibility of the forests (high, medium, low) and an overall recommendation to select a particular district (high, medium, low)

Quantitative criteria framework:

The overall approach was to develop a set of criteria from the available information and the expert rating and develop a standard rating system for each criterion to rank each district in the three target regions from low (1), medium (2) to high (3) priority for selection. The following criteria were established with a short justification description below:

- Annual forest loss % (2007 - 2017): The higher the forest disturbance, the higher the priority for selection
- Forest cover in %: The higher the cover, the higher the priority

- Forest areas in % of the total district forest area in vicinity to roads (0-0.5 km): The more areas are close to road systems, the higher the risk of future degradation
- Forest areas in % of the total district forest area in vicinity to settlements (1-5 km): The more areas are near to settlements, the higher the risk of future degradation
- Required fuelwood resources in m³ per ha of forest: The higher the required cubic meters per ha the higher the risk of future degradation
- Productivity rating by experts: In order to demonstrate visible and verifiable results in terms of proposed ecosystem-based forest management activities within the relative short period of the project some districts were given higher priority due to higher overall forest productivity. This was rated by the experts on the basis of work experience and available information (e.g. Forest Management Plans)
 - Accessibility rating by experts: Many forest areas in Georgia are very remote and not accessible. To strike a balance in the project with districts where the forest areas are already accessible and therefore more 'ready' for implementation in this project, some districts were given higher priority. This was rated by the experts on the basis of terrain maps, road networks and field experience. This expert rating resulted in districts with already higher accessibility as well as some districts without existing accessibility, however, with potential accessibility to larger forest areas in the future if road infrastructure is built
 - Overall expert rating: This represents an overall recommendation and includes taking into consideration conditions such as status on FMP development, existence of forest concessions, protected areas, species abundance, and other ecological gradients. These, for instance, also lead to the prioritization of some districts with lower forest productivity and lower forest accessibility.

Each district was scored overall by calculating an average score. The higher the score, the higher the priority for selection and GCF project intervention.

Results district selection

Table 14 summarizes the individual scores for each of the districts and assessment criteria as well as the overall score. All districts rated with medium and high priority have been selected for interventions in this project.

Table 14: Quantitative GCF project area district selection framework

Region	District	Productivity rating (low 1 to 3 high)	Accessibility rating (low 1 to 3 high)	Overall expert rating (low 1 to 3 high)	Annual loss % (2007 - 2017) (1 =low; 3=high)	Open forest %	Vicinity to roads (0-0.5 km)	Vicinity to settlements (1-5 km)	Required fuelwood re- sources (m ³ /ha forest)	Priority District
Mtskheta -Mtianeti	Dusheti	2	1	1	3	3	2	2	1	Low
	Mtskheta	1	3	1	1	2	1	3	3	Low
	Tianeti	2	3	3	1	1	3	3	1	High

Kakheti	Akhmeta	2	2	3	3	1	3	2	1	High
	Dedoplistskaro	1	2	3	3	3	1	2	3	Medium
	Gurjaani	1	2	1	2	2	2	3	2	Low
	Kvareli	2	2	3	1	1	3	1	1	Medium
	Lagodexi	2	2	1	2	2	3	1	2	Low
	Sagarejo	1	3	1	1	2	1	3	2	Low
	Signagi	1	3	1	2	3	2	1	3	Low
	Telavi	2	2	3	3	1	2	2	2	High
Guria	Chokhatauri	2	2	1	3	1	3	3	1	Medium
	Lanchkhuti	3	3	3	1	3	1	1	3	High
	Ozurgeti	3	2	2	2	3	1	1	3	Medium

Based on this, the following 8 districts have been selected totaling **293,824 ha** of forest (see Map below). However, the area analyzed in terms of forest degradation and mitigation impacts, as well as SFM planning and implementation within the frame of this project is 270,807 ha (exceeding the NDC and LEDS target for SFM). The difference in area is attributed to information gaps that limited planning, as the outstanding 23,017 ha could not be attributed to a specific-forest formation.

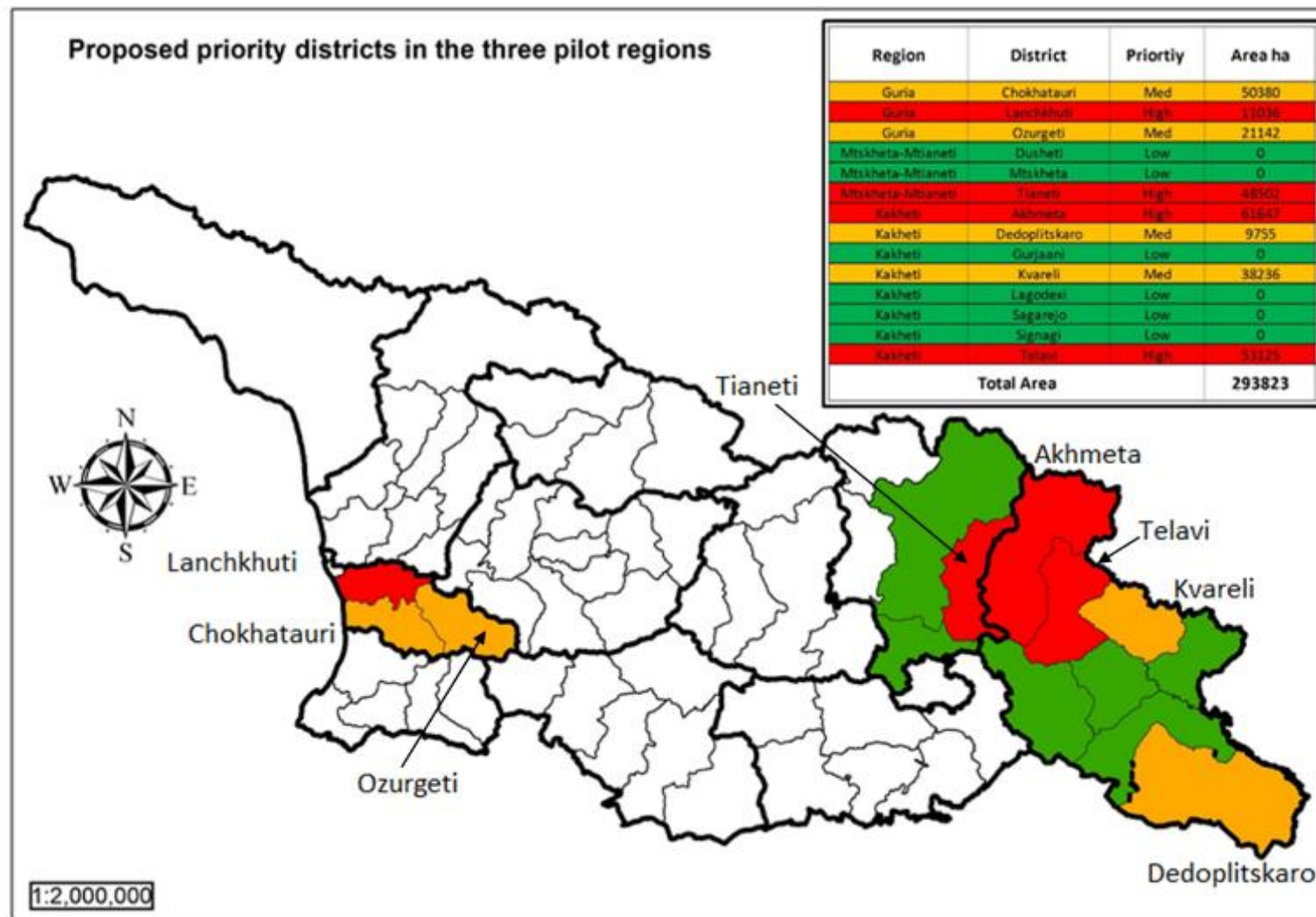


Figure 30: Map of target districts

4.2.1 Overview of regions and target districts: Kakheti

Kakheti is the farthest east region in Georgia, which borders the Russian Federation to the North of the region, and Azerbaijan to the East and South. It also has borders with the regions Mtskheta-Mtianeti, and Kvemo Kartli to the West. The region is home to 312,500 people, living in 8 administrative districts. Kakheti covers 1,137,500 ha. Approximately 30% of Kakheti's territory is covered by forests on NFA managed forest land. Around 98% of forests of the Kakheti region are mountain forests and 15% of forests are protected areas. Forests in Kakheti play a very important ecological and economic role: anti-erosion, climate regulation, water-conservation, creation of natural gene-pool and other functions.

The project will work in four of Kakheti's eight districts: Akhmeta, Dedoplistskaro, Kvareli and Telavi. These districts comprise 58% of Kakheti's forests. The following Table 15 provides a brief summary of these districts:

Table 15: Overview of the project's target districts in Kakheti

District	Forest Cover (ha)*	Description
Akhmeta	61,647	<ul style="list-style-type: none"> 3 concessions, 2 were shut down (highly degraded areas); 500 – 2,200 m.a.s.l.; high forest disturbance; old FMP GIZ is currently supporting NFA to implement FMI and develop FMP for Akhmeta district (to be complete late 2019/ early 2020) The country's first business service yard (for fuelwood provision by NFA) under construction (supported by GIZ), to be completed by end of 2019
Dedoplistskaro	9,755	<ul style="list-style-type: none"> Available data from FMI; high fuelwood demand from forests; 0 - 1,000 m.a.s.l.; no FMP; very dry conditions and desertification in some areas
Kvareli	38,236	<ul style="list-style-type: none"> Medium priority conditions, 500-2,000m.a.s.l.
Telavi	53,125	<ul style="list-style-type: none"> Medium priority conditions, 500-2,000m.a.s.l.

* NFA Managed Forest Fund Land

4.2.2 Overview of regions and target districts: Mtskheta-Mtianeti

Mtskheta-Mtianeti is home to 93,600 people living in four administrative districts. It is located in eastern Georgia sharing borders with various other regions in Georgia: Shida Kartli to the West, Tbilisi and Kvemo Kartli to the South, and Kakheti to the east. The Russian Federation borders Mtskheta-Mtianeti to the North. Mtskheta-Mtianeti covers 560,600 ha. Approximately 40% of Mtskheta-Mtianeti's territory is covered by forests on NFA managed forest land.

The project will work one of Mtskheta-Mtianeti's four districts: Tianeti. Tianeti comprises approximately 21% of Mtskheta-Mtianeti forests. The following

Table 16 provides a brief summary of this district:

Table 16: Overview of the project's target district in Mtskheta-Mtianeti

District	Forest Cover (ha)*	Description
Tianeti	48,502	High forest cover, mostly forested 1,000 – 2,000 m.a.s.l.; old forest management plan

* NFA Managed Forest Land

4.2.3 Overview of regions and target districts: Guria

Guria is home to 109,400 inhabitants living in three administrative districts. It is located in Western Georgia along the Black Sea sharing borders with the Autonomous Republic of Adjara to the South, Samtskhe-Javakheti to the Southeast, Imereti to the east, and Samegrelo-Zemo Svaneti to the North. It covers an area of 203,320 ha, of which approximately 46% is covered by NFA managed forest land.

The project will work in all of Guria's districts: Chokhatauri, Lanchkhuti, and Ozurgeti (Table 17).

Table 17: Overview of the project's target districts in Guria

District	Forest Cover (ha)*	Description
Chokhatauri	50,380	<ul style="list-style-type: none">WB is supporting FMP development (to be completed by end of 2019/ early 2020)High forest cover; high forest disturbance and large forest edges to roads and settlements;
Lanchkhuti	11,036	<ul style="list-style-type: none">FMP nearly complete, and should be endorsed in 2019;High productivity; 0 – 2,000 m.a.s.l.; high fuelwood demand
Ozurgeti	21,142	<ul style="list-style-type: none">High productivity; high fuelwood demandFMP undergoing development, should be complete by end of 2019/ early 2020

* NFA Managed Forest Land

5 ANALYSIS OF PROJECT BASELINE SITUATION AND BARRIERS

This chapter provides an overview of current practices and conditions that comprise the project's baseline.

5.1 Problem analysis: forest degradation as the main source of GHG emissions in the forest sector

5.1.1 Evidence of forest degradation

5.1.1.1 National Level

There is differing information on the extent of forest cover change in Georgia, where different studies present different estimations. According to official reporting to the FAO Forest Resource Assessment and Forest Europe, the forest area of Georgia has slightly increased since 1990, and has been stable since 2013. Patarkalashvili (2016) estimated that between 2003 and 2016 the country's forested area declined by 2.5%.¹⁹⁷ Global Forest Watch (GFW) data set satellite images of the project from the University of Maryland, Google Tree Cover Loss estimate that Georgia has lost 9,700 ha of cover between 2001 and 2017 (0.31% decrease).

While deforestation is not considered an issue at scale in Georgia, forest degradation is a major challenge faced by the country. Forest degradation in Georgia results in a loss of forest structure, and further declines in productivity, and the diversity of native species.¹⁹⁸ The BUR and latest National GHG Inventory state that "...Georgian forests are severely degraded..." and "...deforestation exerts a negative influence on forest's total ability to absorb carbon". Quantification of the scale of problem, however, is not provided in the documents.

Info Box 7: Definitions of forest degradation¹⁹⁹

International definitions

There are numerous definitions of forest degradation. One commonly accepted definition of forest degradation proposed by the Second Expert Meeting on Harmonizing Forest-Related Definitions of Use by Various Stakeholders is as *"the reduction of the capacity of a forest to provide goods and services."*²⁰⁰ IPCC (2003) defines forest degradation as *"a direct human-induced longer-term loss (persisting for X years or more) of at least Y% of forest carbon stocks (and forest values) since time T and not qualifying as deforestation or an elected activity under Article 3.4 of the Kyoto Protocol."* ITTO (2002, 2005) categorized forest degradation as degraded primary forest, secondary forest, and degraded forest land:

- **Degraded primary forest:** "the initial cover has been adversely affected by the unsustainable harvesting of wood and/or non-wood forest products so its structure, processes, functions and dynamics are altered beyond the short-term resilience of the ecosystem."

¹⁹⁷ Patarkalashvili 2016.

¹⁹⁸ Akhalkatsi 2015.

¹⁹⁹ Adapted from FAO 2011.

²⁰⁰ FAO 2011.

- **Secondary forest:** “woody vegetation re-growing on land that was largely cleared of its original forest cover (i.e. carried less than 10% of the original forest cover).”
- **Degraded forest land:** “former forest land severely damaged by the excessive harvesting of wood and/or non-wood forest products, poor management, repeated fire, grazing or other disturbances or land uses that damage soil and vegetation to a degree that inhibits or severely delays the re-establishment of forest after abandonment.”

Based on the ITTO definition, Georgia faces the problem of degraded primary forest, as most of Georgia’s initial forest cover has not been removed, including the high probability of long-term loss of carbon stock.

Definitions in Georgia

Georgia currently does not have an official definition of forest degradation. In Resolution 241 (Regulation of Forest Protection, Reforestation and Maintenance), a degraded stand is defined as a “*stand, where the main features have started to degrade, deteriorate*”.²⁰¹ The new forest code does not include a definition of forest degradation.

For the purpose of the first NFI in Georgia forest degradation is assessed and has been defined as follows: Forest degradation status defines the level of deviation from an undisturbed natural or well managed development of the forest. It is determined on the basis of: Tree coverage (canopy),²⁰² the tree species composition in relation to a natural potential to be expected on the site, the relationship between the main and accompanying tree species, damages of trees and surface, humus and soil.

Assessing forest degradation for modeling greenhouse gas emissions

Currently there are no internationally recognized methodologies to assess forest degradation (see Chapter 9.1.1 for more detailed information on the assessment of carbon benefits). This feasibility study followed the approach of the FAO Ex-ante Carbon-balance Tool where different forest degradation levels are assessed using the % of biomass lost and compared in the baseline and the project scenario. The different available states of degradation within EX-ACT correspond to an average level of degradation, also expressed in terms of percentage of degraded area.

The state of Georgian forests remained mostly unassessed for the last fifteen years, as there has been no comprehensive national forest inventory.²⁰³ The latest inventories in many forestry-districts in the country were conducted within the range of 1986 and 2003. The latest national inventory was conducted in the early 1990s. Majority of forestry-districts also do not have forest management inventories or management plans, and thus are managed based on ad-hoc annual plans (see Chapter 5.1.3).

Aware of the challenges posed due to the lack of information on the country’s forests, a national forest inventory (NFI) process commenced in 2015, where results are expected by the end of 2020. Inventories have been carried out in areas under long-term license contracts (around

²⁰¹ Resolution 241 – Regulation of Forest Protection, Reforestation and Maintenance (2016), page 4 (English translation).

²⁰² There are ongoing discussions in Georgia whether or not the official forest definition should consider canopy cover or density as both approaches have their own unique advantages and disadvantages. There is a preference to move towards density, as it is a more precise measuring unit that eliminates possible errors from assessing crown cover with spatial tools. This language and approach will be integrated into the forest code. In the latest version of the draft Forest Code, the term ‘Forest’ is defined as “*Areas covered with forest forming species and other territories within the forest contour that are an integral part of the forest ecosystem*”. The draft Forest Code further defines ‘Area covered with forest forming species’ as “land plot with the width of minimum 10m and area of not less than 0.5 ha covered with one or several forest forming timber species, where the tree density per area is not less than 0.1”. Thus, the updated definition will likely use the term ‘density’.

²⁰³ The difficulty involved in estimating the impact of such activities on the carbon stock in a traditional image pair approach is evident by the close to 100% margin of error of the forest loss estimate 1990-2000 in Georgia, as reported by Olofsson et al. 2010

166,654 ha).²⁰⁴ After a long period without proper forest inventories, regular management-level inventories were introduced in 2013 for the elaboration of 10-year forest management plans. In 2018, a total 367,940 hectares were covered by management plans (13% of total forest area). However, due to the absence of updated information on the status of forests in most of the country's forested areas, it is not possible to estimate the national scale of forest degradation with sufficient degree of accuracy.²⁰⁵

- Despite data gaps, the underlying socio-economic factors that contributed to forest degradation and the intensity can be traced in three phases starting from 1990s until today.²⁰⁶ **1990-1999:** Developments after Georgia's independence from the Soviet Union, followed by the country's transition towards market economy resulted in deterioration of forests' condition and caused the wide-spread degradation of forests.²⁰⁷ An energy crisis occurred in Georgia after the collapse of the Soviet Union, where access to natural gas was limited, which resulted in unsustainable levels of fuelwood harvesting, including extensive harvesting in natural forests and even the removal of wind-breaker forests.²⁰⁸ Extensive logging occurred during this period as well. One study estimated, around 5-6 million m³ of round wood were illegally harvested each year during this period.²⁰⁹ USAID (2017) estimated that harvesting volumes reached a high of 4.08 million m³ in 1995, representing a large increase from 1990 where levels were estimated at 0.78 million m³ (Figure 32). One study estimated that after extensive logging activities during the 1990s that approximately 24% of forests in Georgia were degraded.²¹⁰ The author further noted the balance between the rate of deforestation and forest degradation, and the forests natural growth/replacement capacity was broken – resulting in the net depletion of forest stocks.²¹¹
- **2000-2012:** After this intensive phase of forest degradation in the 1990s, forests have not recovered, and degradation is ongoing in many regions of the country, primarily due to the extensive harvesting of forests for fuelwood, and to a lesser extent timber. Fuelwood demand slowly declined due to various reasons (gasification initiatives – particularly in urban areas, migration, etc.) but still puts high pressure on forest areas exceeding sustainable utilization estimates.²¹² Between 2007 and 2011, long-term commercial licenses were issued, which also contributed to the degradation of forests (see Chapter 5.1.2 and 5.1.3.2). In 2012, it was estimated that between 2.82 and 4.55 million m³ of wood was removed.²¹³
- **2013-present:** Compared to the previous two periods, it is thought that wood removals have slightly declined or stabilized, although remain extremely high. A couple of studies have estimated that total wood removals declined to around 2.5 million m³ per year from 2013-

²⁰⁴ State Audit Office of Georgia 2016b.

²⁰⁵ Akhalkatsi 2015; MoEPA 2011.

²⁰⁶ It is difficult to quantify recent trends in the forest area and growing stock with any certainty. There has not been a national forest inventory since the collapse of the Soviet Union, and forest management inventories have lagged. Thus, all information on forest degradation in Georgia must be interpreted with a degree of caution considering the substantial data gaps.

²⁰⁷ Kobakhidze 2015; Garforth et al 2016.

²⁰⁸ UNDP & MoENRP 2009; Wind breaker forests are trees planted in the 1960s in order to protect the adjacent agricultural lands and pastures from strong winds, periodically reaching 30-40 m/s.

²⁰⁹ Patarkalshvili 2016.

²¹⁰ Akhalkatsi 2015.

²¹¹ Ibid; MoEPA 2011.

²¹² World Bank 2015; Kobakhidze 2015.

²¹³ Patarkalshvili 1991 and the Tbilisi Institute of Mountain Forestry 1981 in Patarkalshvili 2016 (for the value 4.55 million m³); Georgia's LEDS estimated annual wood removals of 2.82 million in 2012 (USAID 2017).

2015,²¹⁴ and 2.7-3 million m³ in 2016.²¹⁵ Although the volumes of fuelwood and timber harvesting appear to have gradually declined²¹⁶ they are still considered high (see Energy Demand Profile for a more detailed description of trends).²¹⁷ Forest conditions have not improved at scale, and remain degraded due to various barriers that inhibit the adoption of SFM (a detailed assessment of underlying causes and barriers is presented in Chapter 5.4). However, substantial political momentum has been generated during this phase, including the development of the country's National Forest Concept and the drafting of a new Forest Code (currently undergoing Parliamentary Hearings), that aim to reverse degradation trends, and establish an enabling environment for sustainable forest management (See Chapter 5.2 for a detailed description of forest sector reforms since 2013).

The following Figure 31 summarizes the trends observed in lowland, montane semi-steep forests, and the dry forests of Eastern Georgia during this period.

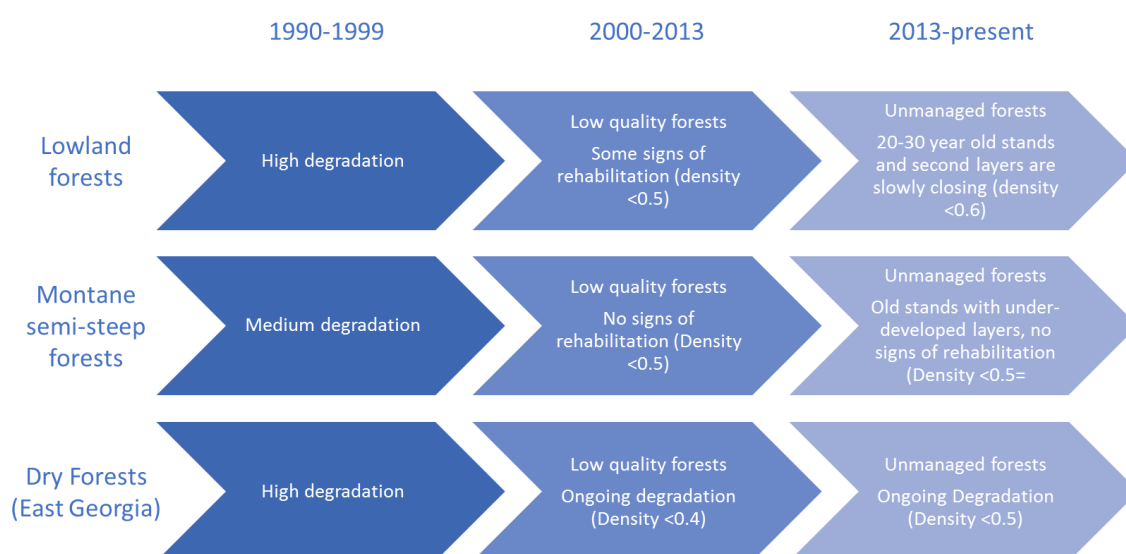


Figure 31: Overview of forest trends and characteristics from 1990-present²¹⁸

The above described degradation trends are aligned with the studies described in Chapter 3.1 (e.g. Borjomi-Bakurjani study by the Austrian Federal Forests Enterprise, Chokatauri study by Sharabidze 2018, among others), where degradation is reducing the forests' carbon sink potential.

While there are some differences in the assessed figures of wood removals in different studies, they all demonstrate a negative trend with removals exceeding sustainable harvesting levels.²¹⁹ Georgia's LEDS found that while in 2014-2015 the annual biomass increment reached 1.57 million m³, it was well below the 1990 figure of 3.78 million m³ (Figure 32).²²⁰ Based on the losses

²¹⁴ USAID 2017.

²¹⁵ Garforth et al. 2016.

²¹⁶ There are no comprehensive studies detailing the cause of the decline, however rural gasification efforts have likely intensified, and migration (urban migration, and out of country) could also have contributed to such trends.

²¹⁷ World Bank 2015.

²¹⁸ Elaborated based on stakeholder consultations and expert interviews during project elaboration.

²¹⁹ Chapter 1.2.1 provides a detailed description of the impact of forest degradation on the country's carbon stocks.

²²⁰ USAID 2017.

and gains in forests from 1990-2015, the LEDS assessment projected that if management practices are not changed, timber resources will decline in Georgia to 279.9 million m³ in 2030.²²¹ This represents a 30% reduction compared to 1990 levels.

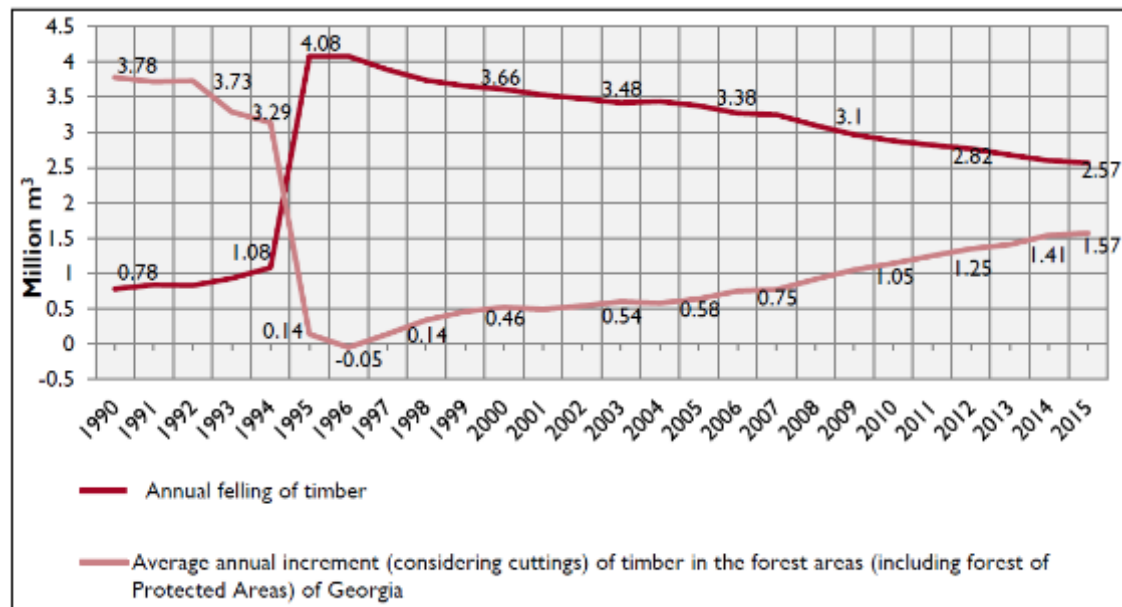


Figure 32: Annual increases and losses of timber in all forested areas of Georgia (1990 – 2015)

Source: USAID 2017

The following two aerial images from Borjomi demonstrate the changing forest conditions between different time periods, where the decrease of canopy cover, reduction of tree density and growth of young stands are evident.

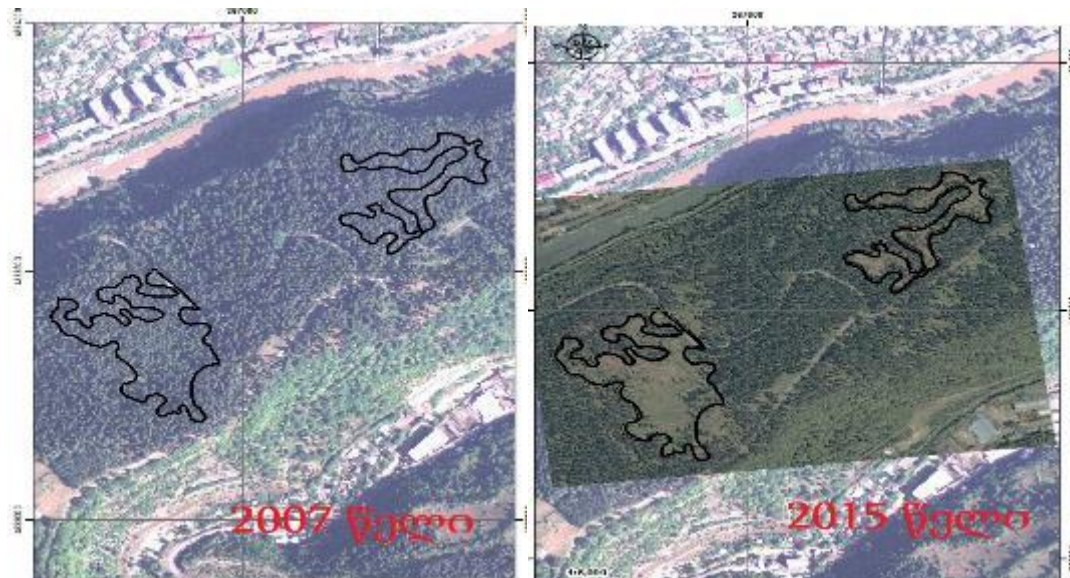


Figure 33: Degraded forest area near Borjomi as a result of illegal tree felling (left: 2007, right: 2015)

²²¹ Ibid.

Despite the lack of such studies or time-series inventories in Georgia, two studies were available and used for this assessment:

- ÖBF study 2015: Carbon baseline for Borjomi-Bakuriani forestry district
- GIZ Study 2018 by Kavtaradze, G.: ‘Evaluation of changes in carbon stock in Kharagauli, Aspindza-Akhaltzikhe and Akhalkalaki forestry districts’

Both studies are from the central, western parts of Georgia, and therefore do not cover the three project regions, however, most of the forest formations which are abundant in the project regions are covered by the studies (these areas are presented in

Table 18). In particular the ÖBF Study was used to derive degradation rates for the specific forest formations. This study established a baseline based on an analysis of historical changes in forest carbon density on the results of the new forest inventory data obtained in 2013/14, which were compared with data from the previous inventory dating back to 1998. Hence, the historical carbon changes cover the period 1998– 2013/14.

In addition, to establish representative carbon stocks for the forest formations of three project regions, average carbon stock values for aboveground biomass, belowground biomass, litter and deadwood were derived from the following literature and peer-reviewed studies:

- ÖBF study 2015: Carbon baseline for Borjomi-Bakuriani forestry district
- Agricultural University of Georgia. Estimation of carbon stocks sequestered in the forests of Georgia determination of conversion factors
- Nakaidze et al. 2012: Determining carbon stock in forest stands of Caucasian pine and oriental spruce in Georgia
- Urushadze et al. 2011: Carbon stocks in the main Georgian forest formations
- Vachnadze et al. 2015: Evaluation of organic carbon stock in soils of beech forests of eastern Georgia
- Vachnadze et al. 2016: Carbon stock sequestered from the atmosphere by coniferous forests of Eastern Georgia in conditions of global warming
- Vachnadze et al. 2016: Carbon stock sequestration from the atmosphere by coniferous forests in Svaneti

The table below summarizes the carbon stocks from this assessment for the different forest formations in the three project regions which are used as current carbon stocks at the beginning of the GCF project. The areas per forest formation class were derived based on NFA data.

Table 18: Distribution of carbon stocks within different carbon pools for the forest formations in the project area

National Forest formation Class	Area in the GCF project (ha)	AGB tC/ ha	BGB tC/ ha	Litter tC/ ha
Alder forests	16,184	20.9	5.8	6.0
Beech forests	150,633	76.0	20.8	6.0
Fir forests	23,321	90.3	25.5	4.3
Hornbeam forests	32,464	35.0	9.4	6.0
Oak forests	34,345	39.6	11.7	6.0
Spruce forests	13,860	85.4	23.7	23.3
Total area	270,807			

Results of the baseline assessment

Using the information from the aforementioned degradation studies, the baseline degradation rate for each of the main forest formations was derived. The historic degradation based on the carbon inventory between 1998 and 2014 was 18.4% as shown in the Figure below.²²³ The same study also presented the degradation rates for most of the relevant forest formations for the same period. Based on this, an annual historic degradation rate for each forest formation in the project was derived, and the annual degradation rate projected for a 20-year period. The 20-year degradation was equally distributed among six classes – from extreme (representing the historic degradation), large, moderate, low, very low, to none. This is shown exemplary for Beech forests, being by far the largest forest formation in the project (Table 19).

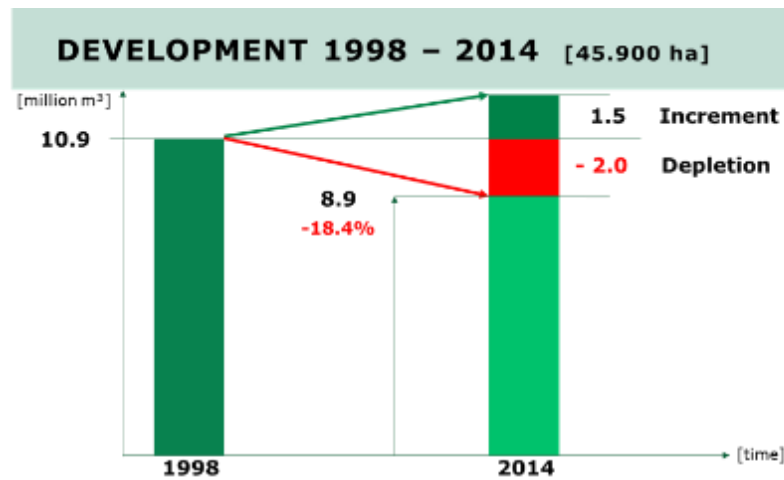


Figure 35: Degradation assessment in Borjomi-Bakuriani forestry district from 1998-2014

Source: ÖBF study 2015

Table 19: Degradation classes (biomass %) after 20 years for beech

Beech	
Degradation (% of biomass lost after 20 years)	
None	0
Very low	5
Low – GCF project scenario	10
Moderate – assumed baseline	15
Large	20
Extreme – historic degradation	26

To be conservative, it was assumed for the baseline scenario for the project that in the next 20 years the historic baseline will reduce to the class of ‘moderate’ even without the project being

²²³ ÖBF 2015.

implemented. This was done for all 6 forest formations in the project; for Hornbeam and Alder an average degradation rate from the summary of other softwood species was used.

The following Figure 36 shows the results of this approach, showing the carbon stocks in 1998 and 2014 for the main forest formations in the project area, based on the inventory of the degradation study as well as the projected degradation in the baseline after 20 years. Based on the case study above, it is assumed that there was a decline of 20.2% of forest carbon stock²²⁴ in main forest formations of the project region from 1998-2014 (historical reference period). It is expected to conservatively further decline by 15.4% in 2040 if business as usual practices continue (baseline scenario). The following sub-chapter goes into detail on the drivers and underlying causes of forest degradation, providing more detailed insight into BAU practices.

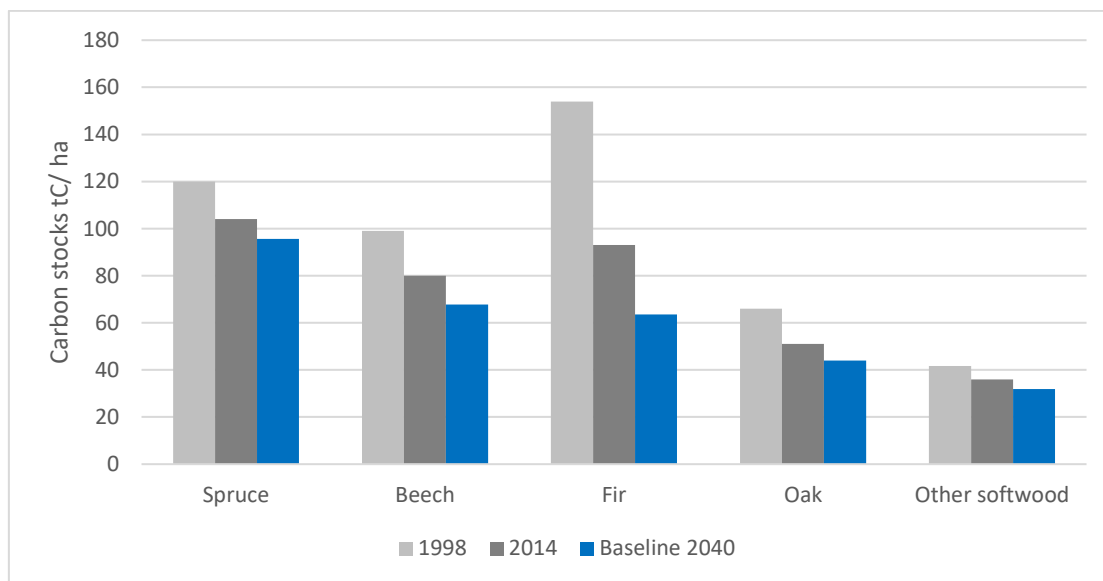


Figure 36: Historic degradation 1998 - 2014 and projection under baseline scenario for predominant forest formations in the project's target districts (moderate scenario)²²⁵

Source: based on ÖBF study 2015, and Urushadze et al. 2011

²²⁴ The historical degradation rate is higher than the rate from the case study, since only those degradation rates of the forest formations abundant within the project region were considered.

²²⁵ Note: existing studies do not provide a full, reliable and comprehensive picture of forest degradation, and therefore the assessment has to rely on a variety of studies, expert judgement and knowledge of the real-life conditions when making assumptions and deciding on the specific input values to use in the analysis.

5.1.2 Drivers of forest degradation

Nationally, the main direct driver of forest degradation in Georgia is the over-harvesting of timber products, especially for fuelwood, and to a lesser extent industrial timber.²²⁶ Grazing, as well as forest fires, pests and disease also lead to forest degradation, however to a much lesser extent than fuelwood and timber harvesting.²²⁷ The following sub-chapters will provide an overview of the main proximate (direct) drivers of forest degradation at the national and Target region level, where possible.

5.1.2.1 Wood removals: fuelwood harvesting and commercial timber

National level

Wood removals are considered the main driver of forest degradation in Georgia, primarily from fuelwood (~76-81% of total wood removals), and to a lesser extent industrial/ commercial timber (~19-24%).²²⁸ The following Figure shows the volume of legally felled timber in Georgia from 2010 to 2017. Since 2013, the volumes of legally felled timber have been within the range of approximately 620,000 to 720,000 m³ per year (Figure 37).

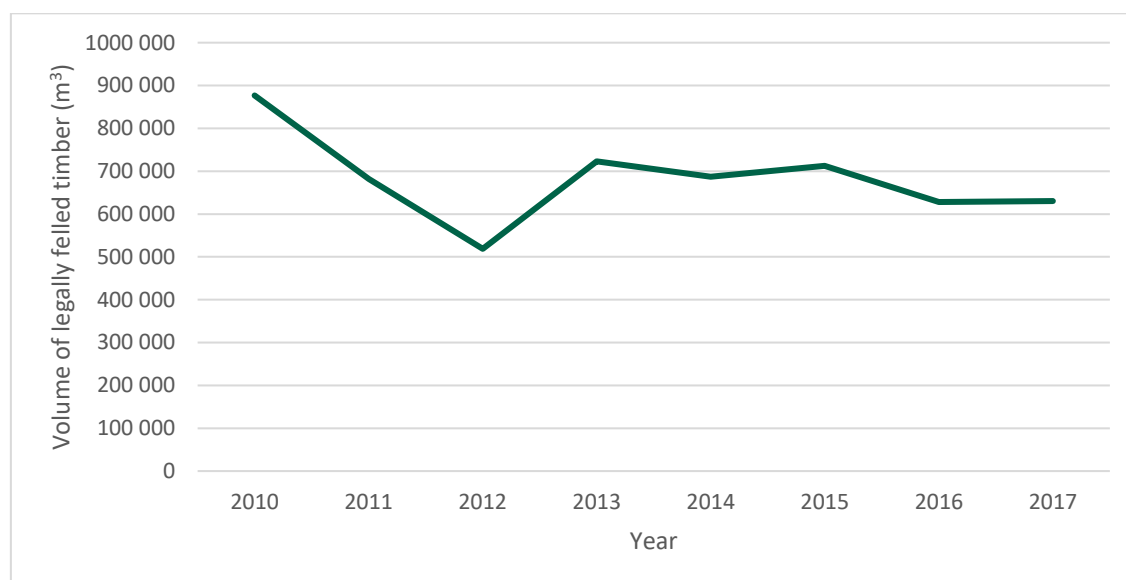


Figure 37: Volume (m³) of legally felled timber in Georgia

Source: GEOSTAT 2019e

Official statistics and actual volumes harvested differ substantially, due to the high percentage of illegally harvested wood. Illegal timber harvesting is difficult to monitor and thus estimates are often based on household and industry demand/ consumption studies. One of the most recent and comprehensive studies was conducted by Garforth et al. (2016). In their study they compared government statistics with demand and consumption studies to estimate illegal logging in 2014. In 2014, official government statistics noted that 687,171 m³ were harvested nationally in 2014 (Figure 38). Garforth et al. noted that an additional 2-2.3 million m³ of wood was

²²⁶ Garforth et al. 2016.

²²⁷ MoENRP 2016a; USAID 2017; GIZ 2016; World Bank 2016, World Bank 2018b; Stakeholder Consultations.

²²⁸ Garforth et al. 2016.

harvested illegally: 1.7-1.8 million m³ for fuelwood, and 300,000-480,000 for industrial wood. As a result, total wood removals²²⁹ in 2014 were estimated to be within the range of 2.7-3 million m³. Fuelwood comprised between 77-81% of total wood removals, where an estimated total of 2.2-2.3 million m³ of fuelwood was harvested in 2014. Commercial timber comprised between 18-22% of total wood removals, with an estimated 480,000-660,000 m³ was harvested. An additional 20,000 m³ of timber was harvested legally for “other” commercial purposes (~1% of total wood removals). Similar figures for the volume of total removals were found in the LEDS study, which estimated around 2.6 million m³ were harvested in 2014.²³⁰

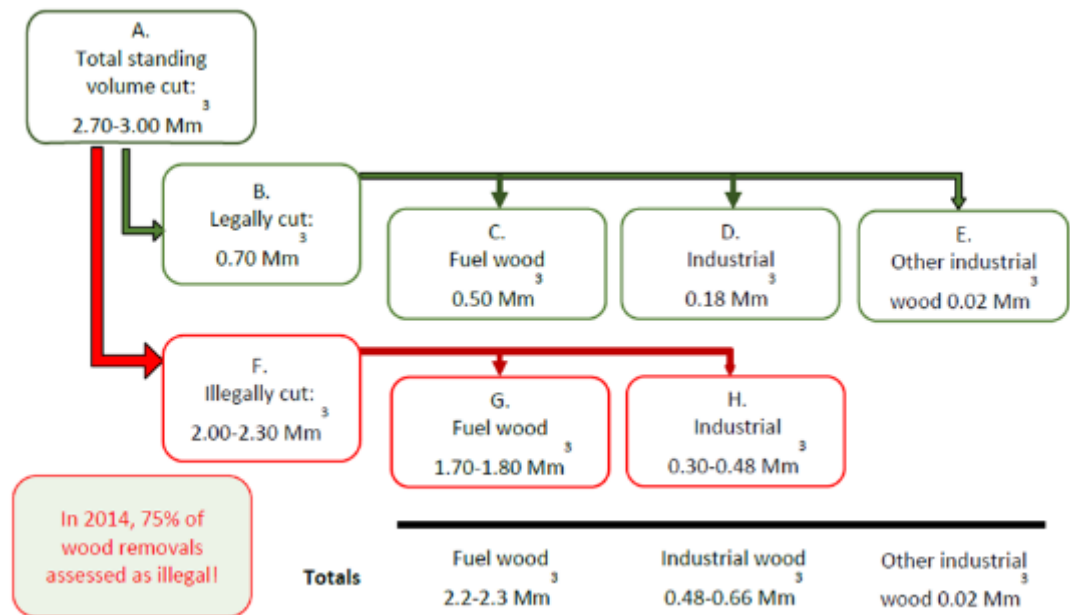


Figure 38: Overall wood removals in Georgia in 2014 in million (M) cubic meters (m³)
 Source: Garforth et al. 2016

The results from Garforth et al. (2016) and USAID (2017) imply that ~75% of wood removals were illegal in 2014. These figures are similar to other studies that have compared demand and consumption figures to official allocated resources, where actual fuelwood removal volumes exceeded official government statistics on felled timber by 4-8 times (

²²⁹ Legal and illegal.
²³⁰ USAID 2017.

Table 20).²³¹ Such discrepancies are clear when looking at household fuelwood consumption figures, described in greater detail in the Chapter on root causes below (Chapter 5.1.3.1). Illegal logging leads to major economic losses for the state, with some studies estimating annual losses within the range of GEL 100-300 million per year (EUR 43.6-100.6 million).²³²

²³¹ State Audit Office 2016a; USAID-HPEP 2014; GEOSTAT 2014; GEOSTAT 2013, CENN 2016.

²³² CENN 2016; Garforth et al. 2016. The figure includes losses due to legal harvesting under the social wood program, that offers fuelwood at a “social price”.

Table 20: The average difference between fuelwood consumption and the allocated resource according to the surveys²³³

Source/Year	Real fuelwood consumption (m3)	Officially allocated resources (m3) ²³⁴	Consumption is higher than allocation	Deficit (m3)	% of fuelwood that was illegally harvested (%)
USAID-HPEP (2014)	4,614,851	595,324	8 times	4,019,527	87%
GEOSTAT (2014)	2,543,200	595,324	4 times	1,877,523	76%
GEOSTAT (2013)	2,543,200	595,324	4 times	1,947,876	77%
CENN (2016)*	2,426,138	600,000	4 times	1,826,138	75%

Source: State Audit Office 2016a and *CENN 2016

As defined above the degradation trend cannot be easily derived from the available data on i) the official statistics of legal harvesting nor ii) from demand side studies. Due to the lack of up-to-date forest management plans and scarce information from national inventories, important data on the sustainable yield are missing. Without an overview on increment and yield levels, a sustainable yield level cannot be allocated.

However, using existing information, various studies have estimated values, using several assumptions and acknowledging major data gaps. The country's existing standing wood volume has been estimated within the range of 148-168 m³/ha.²³⁵ Annual increments have been estimated within the range of 1.5-2 m³/ha/year,²³⁶ however these values are considered to be too low for the average site conditions and resulting productivity in Georgia, where a fully stocked stand can reach 4-25 m³/ha/year.²³⁷ Based on Georgian yield tables that have been corrected based on the density level found in degraded stands,²³⁸ an annual increment of 2.7m³/ha/year is considered a more realistic estimate.

Annual increment can be used to provide some insight on sustainable yields and degradation,²³⁹ however the level of sustainable harvesting in harvesting is likely much lower than this given the country's history of forest exploitation and degradation, where majority of accessible forests

²³³ State Audit Office 2016a.

²³⁴ Allocation of forest areas for social felling is done without a thorough analysis of the optimal volume of yearly extractable timber at sustainable level, due to the inexistence of up-to-date forest information and lack of FMPs.

²³⁵ The value 148m³/ha was utilized in the forest model (described in Section 0), whereas a value of 168m³/ha was used in the Wood Market Study conducted by Garforth et al. 2016.

²³⁶ Garforth et al. 2016; USAID 2017.

²³⁷ Mirzashvili and Kufaradze 1955.

²³⁸ Yield tables from Mirzashvili and Kufaradze 1955 were used and assessed along with information including dominant forest formation types (Urushadze et al. 2016), age class information from 2 recently updated FMPs (Lanchkhuti and Akhalkikhe, the latter for conifer tree species), and 2 old FMPs (Tianeti [2003] and Akhmeta [2003] for Eastern Georgia), density information and composition from 2 recent FMPs, increment and yield data from yield tables (Mirzashvili and Kufaradze 1955), and further informed by expert interviews, meetings and workshops during project development. The modeling approach is described in Greater detail in Chapter 5.2.

²³⁹ Data on sustainable yield levels are not available on the national level, which would normally be a decisive figure used for the analysis of forest degradation.

(i.e. those accessible via forest access roads and skidding trails)²⁴⁰ are degraded and in need of restoration. In many areas the age class distribution is not balanced, and instead are dominated by younger exploited and degraded stands. In such areas a sustainable yield value may be around 1.1m³/ha/year, assuming slow natural regeneration, high target diameters, and optimized carbon sequestration.

Thus, the country's wood removals (both legal and illegal) exceed the assessed sustainable yield levels as described in the following Figure. The differences are particularly stark when focusing on the accessible and manageable forest area (for all forest management activities – including maintenance, restoration, etc.),²⁴¹ which is often 45-60% of the total forest area.²⁴² Thus, based on business as usual practices forest degradation continues, where the wood demand and real harvesting levels exceed sustainable yield levels.

Table 21. Estimated current harvesting levels and sustainable yield levels in Georgia

	Estimated Current Harvesting Levels	Estimated Sustainable* Harvesting Levels
Entire Forest Area	1.04 – 1.4 m ³ /ha/year	1.1 m ³ /ha/year
Available and accessible/ manageable forest area (60-65% of the total forest area):	2.4 m ³ /ha/year	1.8 m ³ /ha/y

**Calculated using the assumptions and estimations described in the text above*

Chapter 5.2.3.4 presents a sustainable forest management model designed to inform project design and planning. Through this modeling exercise, especially through the analysis of existing information and Georgian yield tables, it was determined that the forests' natural productivity potential is much higher than the existing data on volume and increment show. However, to capitalize on this potential the country needs to transition from unsustainable business as usual practices to sustainable forest management, where target restoration processes can be initiated and lead to a fast and substantial increase of biomass, wood volume and sequestered carbon, among other benefits.

²⁴⁰ Access roads and skidding trails is a major limiting factor, as many accessible forests are degraded. This issue is described in further detail in Chapter 5.1.3.3.2.

²⁴¹ Note: Cutting operations should not remove more than 20% of the standing volume in the cutting area.

²⁴² On average, under SFM only 45-60% of the forest are is "managed" in the sense that active interventions occur in these areas, including management for a variety of purposes (reforestation/restoration, commercial use, improving protective functions, etc.). Other areas serve an important role under conservation or protection (often including reference forest areas, protective forest areas on steep slopes or near water bodies).

Project region level

Based on NFA data for the three project regions, the average total harvesting rate over the past 5 years was 206,686 m³ per year (Figure 39 and Table 22).²⁴³ From this, the records allocate 185,975 m³ per year for fuelwood and 20,710 m³ per year for industrial wood, which means that roughly 90% of the recorded harvested wood is fuelwood.

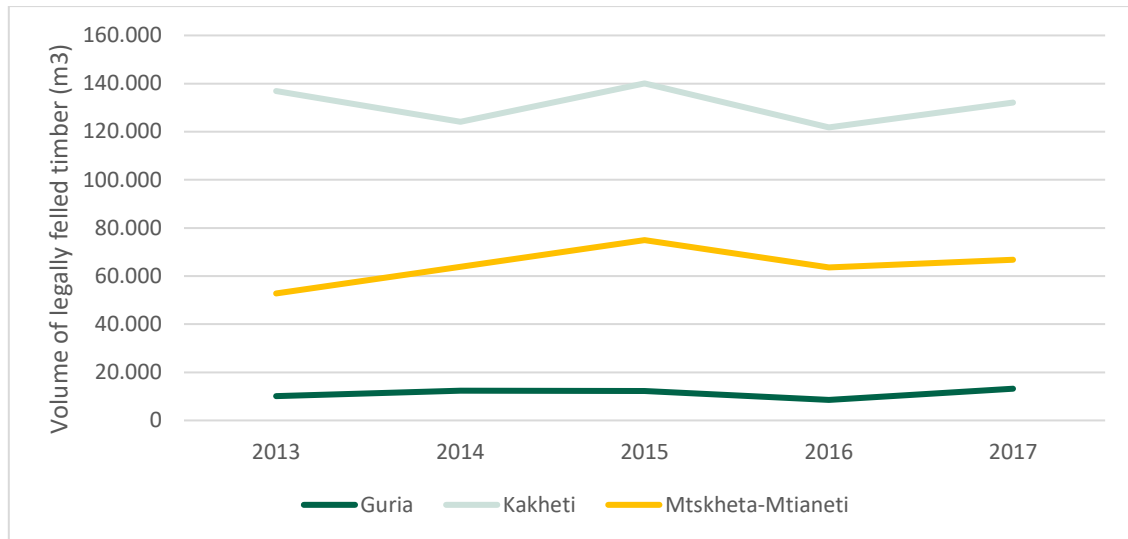


Figure 39: Volume (m³) of legally felled timber within the three target regions²⁴⁴

Source: Regional profile compiled by NFA for project feasibility study

Table 22: Legal timber and fuelwood harvesting in the 3 project regions from 2013-2017

Year/ Region	I) quality wood - commercial timber (m ³)	II) quality wood – fuelwood (m ³)	Total (m ³)
2013			
Total – all 3 regions	12,855.7	187,003.3	199,859.0
Guria	2,240.3	7,909.6	10,150.0

²⁴³ In 2017, 212,042 m³ of timber was harvested in the project region (

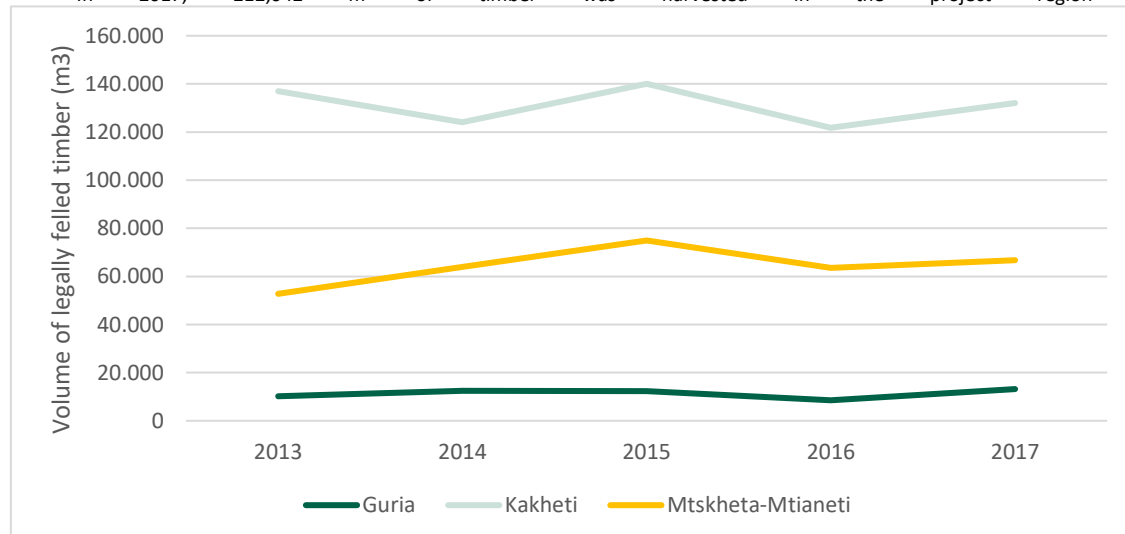


Figure 39), of which 177,456 m³ (84%) was for fuelwood, and 34,586 m³ (16%) for commercial timber.

²⁴⁴ These figures, however, do not demonstrate the true scale of fuelwood consumption in the region, since it does not include illegal removals.

Year/ Region	I) quality wood - commercial timber (m ³)	II) quality wood – fuelwood (m ³)	Total (m ³)
Kakheti	8,095.5	128,842.1	136,937.5
Mtskheta-Mtianeti	2,519.9	50,251.6	52,771.5
2014			
Total – all 3 regions	10,582.4	189,848.1	200,430.5
Guria	2,504.7	9,920.2	12,424.9
Kakheti	6,340.8	117,767.7	124,108.5
Mtskheta-Mtianeti	1,736.9	62,160.2	63,897.1
2015			
	19,181.5	208,071.4	227,252.9
Guria	2,409.5	9,856.0	12,265.5
Kakheti	13,165.0	126,887.4	140,052.4
Mtskheta-Mtianeti	3,607.0	71,328.0	74,935.0
2016			
Total – all 3 regions	26,346.3	167,497.0	193,843.3
Guria	1,617.3	6,908.7	8,526.0
Kakheti	19,270.0	102,502.6	121,772.6
Mtskheta-Mtianeti	5,459.0	58,085.8	63,544.7
2017			
Total – all 3 regions	34,586.0	177,456.4	212,042.4
Guria	4,169.6	9,015.1	13,184.7
Kakheti	21,712.4	110,355.1	132,067.4
Mtskheta-Mtianeti	8,704.1	58,086.2	66,790.3

Source: NFA, unpublished

CENN (2016) however, found that the required fuelwood resources for the three regions amounts to 725,156 m³ per year. Comparing this with the legally harvested fuelwood records means that 75% of required fuelwood resources are assumingly removed illegally from the forests – equivalent to 547,699m³ (Figure 40). Breaking this down on a ha-basis means that 2.5 m³/ha per year need to be harvested from the entire forest area in the target regions to satisfy the fuelwood demand, again exceeding sustainable harvesting levels. Considering that large shares of the forests in the three target regions that are not accessible or very remote, this leads to extraction rates well above the annual increment causing forest degradation.²⁴⁵

The scale of illegal harvesting for industrial wood is based on the national average as more detailed regional data on potential illegal harvesting is not available. Assuming 67% of commercial timber is illegally harvested nationally,²⁴⁶ an additional 70,584 m³ of industrial timber was likely harvested in 2017. This would lead to a total removal (illegal and legal) of 105,170 m³ of industrial wood in the three regions.

²⁴⁵ An annual increment of 2 m³/ha/year was utilized in the Borjomi-Bakuriani assessment, which can be used as a conservative estimate given the lack of comprehensive national and regional data.

²⁴⁶ Based on Garforth et al. 2016.

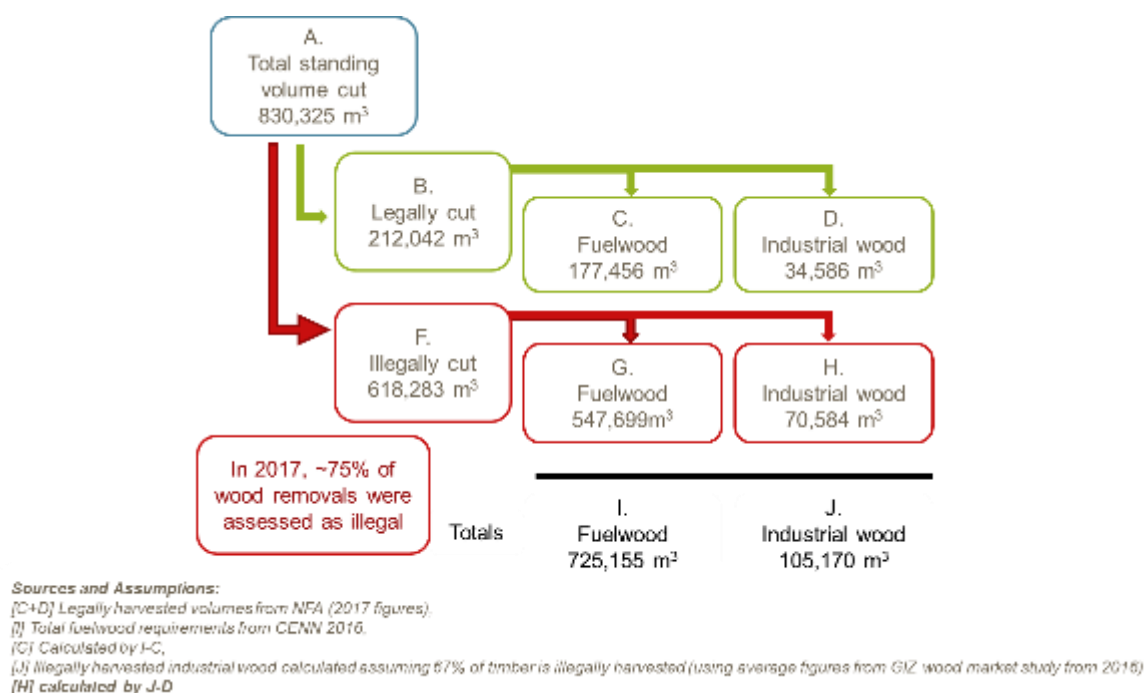


Figure 40: Legal and illegal wood removals in Kakheti, Mtskheta-Mtianeti and Guria in 2017

5.1.2.2 Overgrazing by livestock in forested areas

National level

In some areas of Georgia, livestock raising is an important source of household income and for household subsistence.²⁴⁷ Popular types of livestock in the region include cattle, horses, sheep, goats and pigs, among others. Livestock statistics are difficult to compare, as a methodological change occurred in 2014 that limits the comparison of data prior to 2014 with 2014-present official statistics. Considering the period from 2014-2017, the number of heads of cattle, sheep, and goats have declined nationally (Table 23).

Table 23: Number of livestock in the project target district Guria, Kakheti and Mtskheta-Mtianeti, in thousand heads²⁴⁸

	Heads of cattle		Heads of sheep		Heads of goats	
	2014	2017	2014	2017	2014	2017
National						
Total (entire country)	970,000	909,700	865,900	855,900	53,700	51,100
Target districts						
Guria	N/A	39,900	N/A	N/A	4,500	3,400
Kakheti	110,000	95,900	474,400	499,800	16,900	17,500

²⁴⁷ ENPI EAST FLEG II. 2014.

²⁴⁸ GEOSTAT, http://www.geostat.ge/index.php?action=page&p_id=428&lang=eng. Note: "The main source of sample frame for 2006-2015 years of surveys was Agricultural Census 2004. The sample frame for 2016-2017 years of survey has been updated and is based on Agricultural Census 2014. Consequently, in order to ensure comparability of data of 2014-2017 years, reconciliation of the data has been made for the years of 2014 and 2015. Therefore, the data of 2014-2017 years are not comparable to the data of 2006-2013 years."

	Heads of cattle		Heads of sheep		Heads of goats	
	2014	2017	2014	2017	2014	2017
Mtskheta-Mtianeti	N/A	35,800	46,900	53,300	1,800	1,500

N/A, not available, *Source: GEOSTAT*

Despite the decline in livestock ownership, some regions are still affected by uncontrolled livestock grazing, resulting in forest degradation – although at a lesser scale than fuelwood. Livestock can greatly limit natural regeneration, interrupting seed germination, seedling survival and growth. Livestock, particularly goats and cattle, consume young vegetation that limits regeneration (both natural and assisted) if protective grazing control measures are not taken. In heavily browsed areas, soils are more exposed due and are more vulnerable to water and wind erosion that can result in land degradation and even desertification (the latter especially in Eastern Georgia). Livestock grazing can further contribute to soil compaction, which can further reduce the forest's natural regeneration capacity.

Unfortunately, there are no systematized data on the extent and area of forest areas affected by over-grazing.²⁴⁹ Assessments acknowledge that lack of data on grazing in forests makes it difficult to assess the scale of its impact on the environment, though experts in Georgia state that grazing plays a role in driving and maintaining forest degradation in certain regions of the country.²⁵⁰ Lower growth rates in forests in Eastern Georgia mean that grazing can have a major impact on exacerbating degradation.

Target region level

In Guria it was noted in stakeholder consultations conducted for this project that free-grazing is commonly practiced, and has a negative impact on forest quality and regeneration. While there are few studies on this, one assessment of forests pests and diseases in Guria found that grazing negatively affected forests in Guria.²⁵¹ However, higher growth rates in the west can often compensate for the net impact of grazing.

In Kakheti and Mtskheta-Mtianeti it was discussed that it is still a challenge in some areas, however to a much lesser extent than in Guria. There has been an increase in the ownership of sheep and goats in Kakheti from 2014-2017, which could result in an increased impact on forests.²⁵² Main causes of excessive grazing include insufficient control from the state authorities, limited awareness of suitable practices, rural poverty, unclear ownership of grazing land, and improper pasture management, among others.²⁵³

In the project area it was noted that it is not comparable in scale to the impact from over-harvesting fuelwood and timber. Nonetheless, in consultations conducted for project development stakeholders mentioned that more could be done to reduce the impact of grazing (incl. fencing,

²⁴⁹ Presently, no data exists on forest areas affected by overgrazing or numbers of total population living by livestock alone. One reason for the lack of data on grazing and its impact of forests has do with the poor documentation of land ownership in the country in general which compromises data collection. Causes of excessive grazing include insufficient control from the state authorities, rural poverty, and improper pasture management, among others (MoEPA 2011; Ministry of Environment Protection of Georgia 2012; Zeidler & Schachtschabel 2016).

²⁵⁰ MoEPA 2011; Ministry of Environment Protection of Georgia 2012; Zeidler & Schachtschabel 2016.

²⁵¹ Ibid.

²⁵² GEOSTAT.

²⁵³ Zeidler and Schachtschabel 2016.

improving communication and coordination with local communities on suitable areas or particularly sensitive areas, developing grazing plans, etc.). Grazing is not mentioned in the existing forest code, and the lack of FMPs means grazing is also often not considered in management planning. At times fencing is applied, however budgets are usually insufficient.

5.1.2.3 Pests and diseases²⁵⁴

National level

Pests and diseases are important hazards and pose a serious threat to Georgia's forests' stability.²⁵⁵ No complete national level phyto-pathological examination of the state forests has been conducted during the last decade, and only limited measures have been implemented to deal with forest pests and diseases (both in terms of prevention and management).²⁵⁶

Pest and diseases such as chestnut cancer (*Cryphonectria parasitica*, formerly *Endothia parasitica*) are being observed in Georgia. In recent years mass dying of Colchic box trees, and of pine trees around Tusheti and around Tbilisi have been observed.²⁵⁷ The regions of Samtskhe-Javakheti (26,000 ha) and Imereti (17,000 ha) were affected by spruce bark beetle (*Ips typographus*) and chestnut blight in 2011-2012.²⁵⁸ In Western Georgia, in Adjara, chestnut endotic cancer is the most widespread in lowland areas, while the great spruce bark beetle (*Dendroctonus micans*), European spruce bark beetle (*Ips typographus* L) and engraver beetle (*Ips acuminatus* Eichh) dominate the higher parts of the region. In addition, new plant pests such as horse-chestnut leaf miner (*Cameraria ohridella* Deschka), trumpet leaf miner (*Tischeria complanella* Hb), oak leaf mining moth (*Tischeria ekebladellia* Bjerkande), and boxwood blight (*Cylindrocladium buxicola*) emerged in Adjara during the period from 2006-2011.²⁵⁹ The impacts from these pests and diseases can differ, however can range from foliage damage, reduced yields and growth conditions, and in severe cases tree dieback. Impacts from pest and disease not only contribute to forest degradation but can also exacerbate forest ecosystems' vulnerability to climate change.

During the period from 2015-2017, NFA implemented measures against the European spruce bark beetle on 26,000ha in Samtskhe-Javakheti. They further used aviation spraying for forest stands in Kvemo Kartli and Mtskheta-Mtianeti regions, and they applied treatment for boxwood blight (*Buxus colchica*) stands covering 500 ha in Guria, Samegrelo, Zemo, Svaneti, Imereti, Racha-Lechkhumi, and Kvemo Svaneti. Preventative planning, early detection and rapid response is required to control the damage and impact from pests and diseases.

Project region

Due to lack of information and monitoring system in the forestry sector, there is limited information on the impact of forest pests and diseases available for the project target regions. Box-

²⁵⁴ Forest pests and diseases are defined as "harmful organisms such as insects, rodents, fungi, bacteria or viruses, increased number of which may endanger ecological condition of forest or significantly reduce quality of timber." – New (Draft) Forest Code, p. 10.

²⁵⁵ Government of Georgia 2014c.

²⁵⁶ Kobakhidze 2015.

²⁵⁷ Zeidler and Schachtschabel 2016.

²⁵⁸ Ibid.

²⁵⁹ MoENRP 2015.

wood blight has been found in forests in Guria (from the invasive fungus *Cy. buxicola*), contributing to the degradation of boxwood forests.²⁶⁰ Some damage from boxwood moths (*Calonectria pseudonaviculata*) and boxwood leaf rust (*Puccinia buxi*) has been observed in boxwood forests in Kakheti, however the damage has not been as extensive as in Western Georgia.²⁶¹ Boxwood forests in Guria also have reported cases of boxwood moths (*Cydalima perspectalis*), which have led to extensive defoliation.²⁶² The pest and spread to a nursery in Guria, where all small plants were destroyed by the moth.²⁶³ Again, while the impact of pest and disease does not have a comparable impact on forests to the extensive harvesting of wood resources, it holds potential to increase its impact in the future if SFM practices are not adopted. Without FMPs, planning and management is often ad-hoc and considering only short-term objectives. Without forest management inventories, there is limited information on the existing impact and prevalence of pests and diseases. In addition, additional studies are required in the project area to understand the impact from pests and disease, including risks associated with climate change (see Chapter 3.2). Finally, additional budget is needed to implement SFM, including preventative measures, and sanitary cuts.

5.1.2.4 Forest fires

National level

According to official statistics, forests fires were rare, and small in scale before 2005.²⁶⁴ Since 2006, forest fires have become more frequent, although there is substantial annual variation in the intensity and frequency of forest fires (Figure 41).²⁶⁵ For example, from 2003-2006 there were 49 forest fires reported affecting an area of 129 ha, whereas from 2015-2017 there were 169 forest fires reported affecting an area of 1,689 ha.²⁶⁶ Most forest fires start in agricultural areas, often due to the burning of agricultural residues and grasslands. In the dry season, these fires easily get out of control, and impact adjacent forested lands.

Fires in 2008 were closely linked to the armed conflict with Russia. In 2017, a total of 1,299 ha were affected by forest fires, the largest area since 2003, during a summer that had notably dry and hot weather conditions.²⁶⁷ The strongest impact of forest fires in Eastern regions of Georgia has been in the region of Samskhe-Javakheti, especially in coniferous forests, (13 cases with 1,010 hectares burned in 2017).²⁶⁸

Around 400,000 ha of forests are considered at risk of wildfires, with the highest risk faced by coniferous forests of Samtskhe-Javakheti region.²⁶⁹ Since 2013, NFA has placed warning banners

²⁶⁰ Matsiakh 2016.

²⁶¹ Ibid.

²⁶² Ibid.

²⁶³ Ibid.

²⁶⁴ UNDP et al 2018.

²⁶⁵ Ibid.

²⁶⁶ NFA 2018, unpublished data.

²⁶⁷ Article on forest fires and Georgia's hot and dry summer conditions: <http://georgiatoday.ge/news/7792/The-Long%2C-Hot-Summer%3A-Why-the-Spike-in-Forest-Fires-%26-What-Can-Be-Done>.

²⁶⁸ UNDP et al. 2018.

²⁶⁹ Ibid.

in fire hazard areas, and they have equipped NFA regional forest offices with primary fire extinguishing equipment, however firefighting equipment is still considered insufficient in most regions (lack of mobile fire trucks, water tanks, etc.).

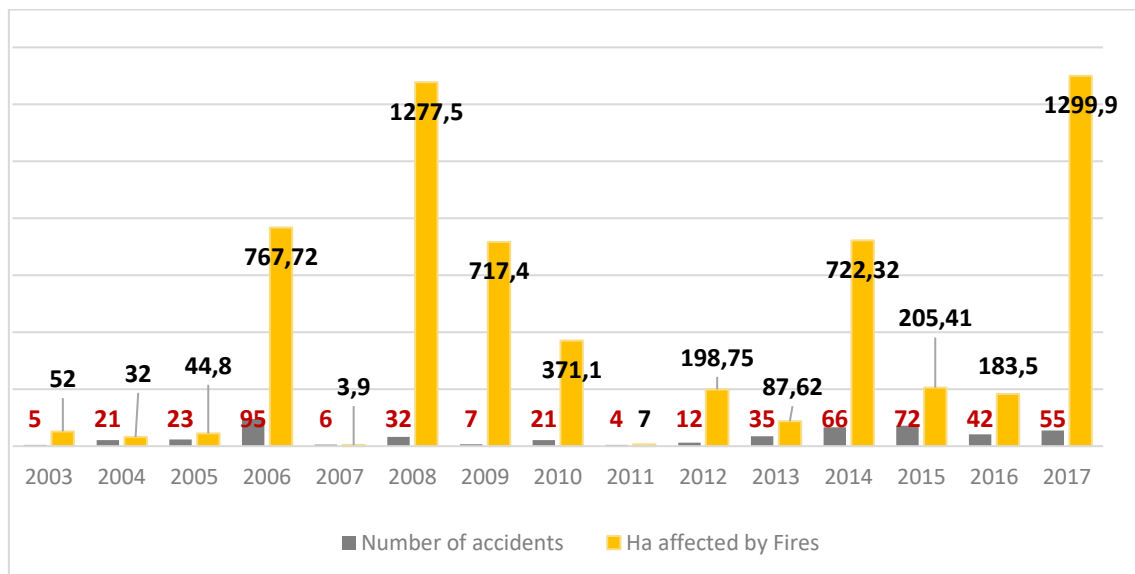


Figure 41: Forest fires in Georgia 2003-2017

Source: NFA 2018, unpublished data

Target region level

All of the regions are considered highly vulnerable to forest fires. Kakheti in particular has dry conditions and is particularly vulnerable. Such trends are evident when looking at Global Forest Watch fire alerts in the last year for the project region (from May 15, 2018 to April 21, 2019):²⁷⁰

- Guria: 32 fire alerts
- Kakheti: 1,201 fire alerts
- Mtskheta-Mtianeti: 45 fire alerts.

Most regions and districts do not have sufficient firefighting gear (including mobile fire trucks, water tanks), which limits the effectiveness of efforts to control them. Also, the lack of FMPs limits medium- and long-term planning that promotes the adoption of preventative practices within every day forest management practices.

5.1.3 Root causes of forest degradation

There are various underlying causes that contribute to forest degradation in Georgia, both in at the national level, and at the target region level (Figure 42). The following sub-chapters explore the main causes identified in literature, as well as through the stakeholder consultations conducted by the project.

²⁷⁰ GFW is an open-source web application for monitoring global forests in near real-time.

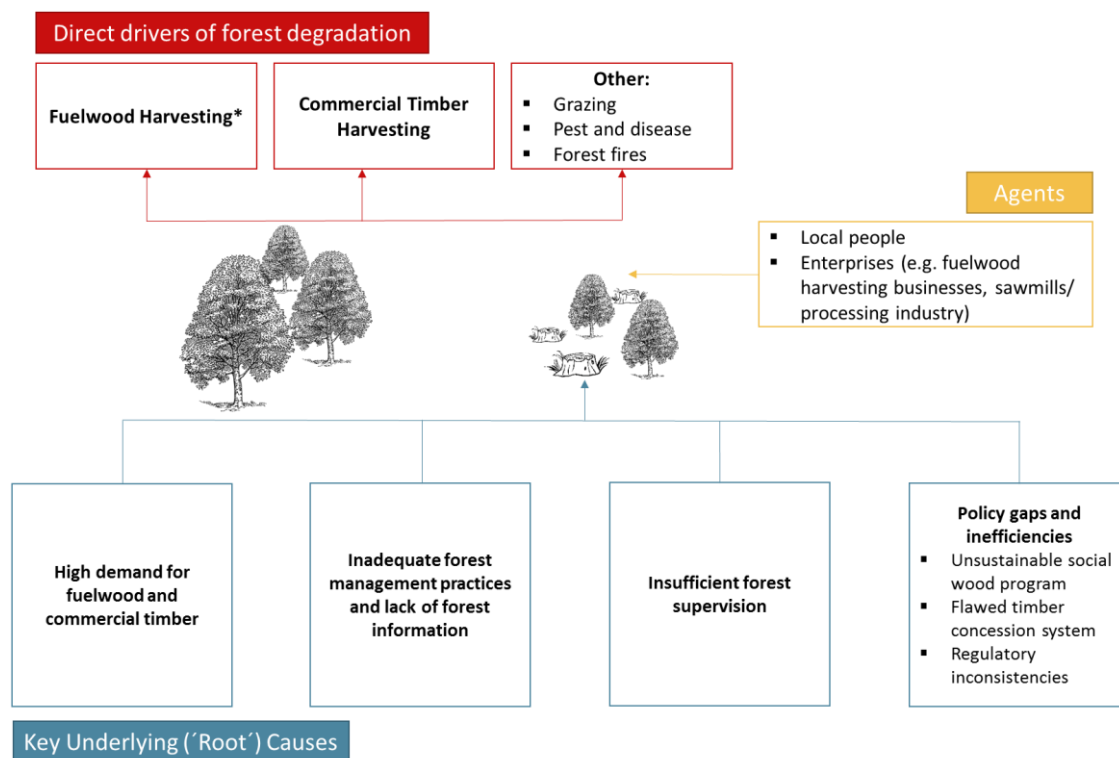


Figure 42: Overview of direct drivers, agents & key underlying causes of forest degradation in Georgia

*The largest driver of forest degradation is fuelwood harvesting

Source: Data from stakeholder consultations and literature cited in Chapters 1, 3 and 5. Photos from Lanchkhuti FMP

5.1.3.1 High demand for fuel wood: baseline rural energy use

National-level

Source of data and information

Official statistics on household energy consumption in Georgia does not exist. For the purpose of this Feasibility Study (FS), the following key sources of information and data have been used. It has to be noted that none of the sources provides full, reliable and comprehensive picture of fuelwood consumption and therefore the team has to rely on expert judgement and knowledge of the real-life conditions when making assumptions and deciding on the specific input values to use in the analysis.

- Geostat 2017:²⁷¹ In 2017 Geostat conducted statistical survey for consumption of energy forms in the household sector, which provided the opportunity to determine the structure of energy consumption in households. Sampling size comprised 3,400 households which ensure to obtain a 2.1% sampling error by country level and no more than 5% sampling error by urban and rural area level. The time frame covered by the survey is from 01.05.2016 to 01.05.2017. The study, however, is only national at scope and does not provide regional

²⁷¹ GEOSTAT 2017.

statistics on fuelwood consumption patterns, volume and costs, which is a significant drawback since the situation varies significantly between the regions due to differences in climatic, economic and social conditions.

- CENN 2016:²⁷² The study provided assessment of the usage of energy sources by local population, with special focus on usage of fuelwood and its share in total energy consumption based on specially developed methodology. It estimated the number of households consuming fuelwood during the winter period and the total volume of household fuelwood consumption with disaggregation by municipalities and regions.
- Helbig 2016:²⁷³ In November 2015, 753 households in the municipalities of Dedoplistskaro and Akhmeta were interviewed with regard to their energy consumption. The questions addressed energy used for space heating, cooking and hot water supply, as well as the consumption of natural gas and electricity. Special attention was given to the supply and consumption of fuelwood. This research project has been supported by GIZ.
- Lekveishvili 2019:²⁷⁴ The data-set is based on 303 interviews of households residing in stand-alone single-family (detached) buildings in small urban and rural settlements outside the large urban agglomerations in Georgia. The original data included household size (number of household members), total and heated areas of building owned by the household, heating source, total annual energy consumption and expenditures for each household, as well as energy consumption and expenditures by types of energy sources.
- Deloitte Consulting LLP 2014:²⁷⁵ USAID-supported survey covered the whole territory of Georgia. Survey sample included 1,081 households (581 urban and 500 rural households). Data on fuelwood consumption and its features have been collected and analyzed, and then the main energy consumption characteristics of space heating, water heating, cooking, cooling, washing and refrigeration have been summarized.

Energy and Fuelwood Consumption Patterns

As described in Chapter 5.1.2, fuelwood is the main driver of forest degradation in Georgia – resulting in the consumption of around 2.0-2.3 million m³ per year across the country and 725,156 m³ per year within the three target regions (i.e. 36% of the total fuelwood use).

Households are by far the largest fuelwood consumers in Georgia: according to Geostat²⁷⁶, annual fuelwood use by households is 2.1 million m³. For comparison, public sector buildings consume only 86,816²⁷⁷ m³, i.e. 4% of the total demand. Households' energy demand is dominated by the energy required for space heating: **82% of the household's energy consumption is used for space heating**, followed by hot water supply (7%), cooking (7%) and other energy needs²⁷⁸.

Heating systems used by dwellings. There are two heating systems in Georgia: an individual central heating system for which natural gas is used and individual heating facilities, for which

²⁷² CENN 2016.

²⁷³ Helbig 2016.

²⁷⁴ Lekveishvili 2019.

²⁷⁵ Deloitte Consulting LLP 2014.

²⁷⁶ GEOSTAT 2017.

²⁷⁷ Estimated by project experts based on data collected from municipalities / ministries of 3,234 buildings which reported their heated area and actual energy consumption.

²⁷⁸ Helbig 2016.

natural gas, as well as electricity, fuelwood, agricultural waste, solid or liquid fuel are used. According to Geostat²⁷⁹, 10.5% of households use individual central heating system operating on natural gas, but only 1.6% of those residing in rural areas have such central heating systems in place. Fuelwood is the primary sources of energy for heating in rural areas: Geostat²⁸⁰ estimates that 78% of rural families rely on fuelwood to satisfy their heating needs, while USAID²⁸¹ puts this number at 95.9% (Figure 43). In addition, 65% of household use fuelwood for hot water preparation and 43% for cooking.

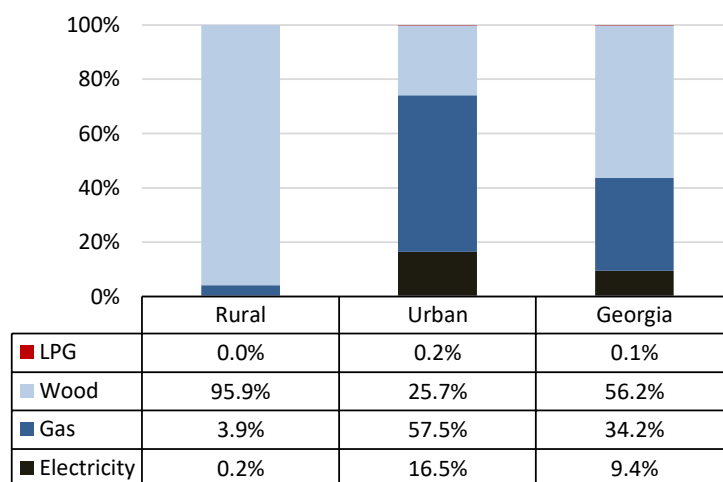


Figure 43: Energy sources used for space heating²⁸²

Despite high level of gasification in Georgia, which currently stands at 81%, and the plans of the Government of Georgia to reach 85% gasification rate by 2021²⁸³, vast majority of rural population do not use or only partially use gas for heating. CENN study²⁸⁴, specifically established that of all gasified households in Georgia (both rural and urban), only 26% rely primarily on gas for heat supply, while 39% do not use gas for heating (only other needs), 8% use gas in combination with fuelwood and 27% do not use natural gas at all. Similar conclusions have been made by USAID²⁸⁵: 65% of rural gasified households keeps on relying on fuelwood for heat supply. Such situation is primarily due to high cost of natural gas compared to fuelwood, as well as high additional investment needed in individual gas-based heating system, which is not affordable for the vast majority of rural households.

Error! Not a valid bookmark self-reference. below compares investment choices which the Georgian households currently have as regards fuel supply alternatives. It can be seen that fuelwood-based heating is by far the cheapest option both in terms of per unit energy cost and the upfront investment needed in the heating system.

Table 24: Comparison of fuel supply alternatives for rural households

²⁷⁹ GEOSTAT 2017.

²⁸⁰ Ibid.

²⁸¹ USAID 2014.

²⁸² Ibid.

²⁸³ <http://caspienergy.net/en/oil-and-gas/46076-gas-supply-to-reach-217-georgian-settlements-in-2019-2022>.

²⁸⁴ CENN 2016.

²⁸⁵ USAID 2014

Heating type	Units	Fuel-wood	Natural gas individual heating	Natural gas central heating system	Briquettes	EE stove + briquette
Cost of fuel	GEL / kWh	0.02	0.05	0.05	0.09	0.09
Annual cost of fuel	GEL	400	1,011.00	714.00	1,560.00	728.00
Cost per kWh of delivered heat	GEL/KWh	0.066	0.167	0.059	0.257	0.120
Investment cost	GEL	90	150.00	3,000.00	90.00	1,000.00
Lifetime of technology	Years	2	10.00	20.00	2.00	3.00
Annual costs of heating system	GEL / year	445	1,026.00	864.00	1,605.00	1,061.00

Source: own calculations

Even with fuelwood being the cheapest heat supply alternative, households spend significant part of their budget on fuelwood: estimates of annual household expenses on fuelwood vary between GEL 270 (USD 100)²⁸⁶ and GEL 590 (USD 219)²⁸⁷. It is important to put these figures into local social and economic context where monthly income of 68% of rural households is below GEL 400 (USD 148) and only 10% of households earn more than GEL 800 (USD 296) per month²⁸⁸. In other words, 68% of rural Georgian population fall under category of poor households (according to the World Banks poverty definition – less than USD 2.5 /person per day²⁸⁹) and spend more than 6 - 12% of the income on fuelwood. Switching to more expensive fuel alternatives, such as natural gas, let alone additional investment in new heat supply systems, for the vast majority of rural households is well beyond their budget.

The following sections provide an overview of the baseline situation in terms of technologies and fuelwood quality, which determine the high fuelwood consumption of the residential sector in Georgia:

Conventional stoves. The most common heating technology in Georgian households is a very basic, obsolete and inefficient wood stove (Figure 44). It is used by large majority of the households (the share of houses with central heating systems in rural area is less than 2%).²⁹⁰ Wood stoves production has a long history in Georgia and in every district, there is at least one workshop for wood stoves. The stove is usually produced of thin metal sheets (0.4 mm) in local workshops, has a life expectancy of around two years and does not adhere to any quality or energy efficiency standards. Efficiency of conventional stove does not exceed 35%.²⁹¹ Woodstoves are

²⁸⁶ GEOSTAT 2017.

²⁸⁷ Lekveishvili 2019.

²⁸⁸ GEOSTAT 2017.

²⁸⁹ Own calculation based on average household size of 3.3 (GEOSTAT) and current currency conversion rate of 2,7 GEL per 1 USD. World Bank's definition of poverty line is 2.5 USD/person/day.

²⁹⁰ GEOSTAT 2017.

²⁹¹ Draft NEEAP, based on testing of conventional stoves in Georgia resulting in an efficiency rating of approximately 35% as found in Lazashvili (2012) Energy and Economic Reasoning of Large-scale Implementation of Energy Efficient Living Stoves.

all of the same basic design, a single combustion chamber with fixed above grate air vents, a flat top is used for heating water and cooking, an ash collection chamber, an oven chamber around which the hot combustion gases circulate, and a rear chimney. In such woodstoves the fire box is not airtight, the door doesn't seal or effectively keep air out, and there is no damper or mechanism for controlling air flow. Operation of the stoves is primitive. There is no air control and the fuelwood burn quickly and hot. This means that the room being heated is subject to large swings in temperature from too hot to too cold. Room temperature is regulated with outside air. The stove is usually is used for space heating for about 6.2 months per year. The most common model has a power of about 3-5 kW and is sufficient to heat up to 40m² of space, i.e. 25-30% of the size of the average rural household building in Georgia.



Figure 44: Conventional heat stoves

Due to its low efficiency, combustion of fuelwood in conventional stoves results in much higher emissions per unit of fuel including many products of incomplete combustion such as PM_{2.5} and carbon monoxide (CO) – two major air pollutants. Small-scale solid fuel combustion is also an important source of black carbon (BC) emissions. BC is a component of PM_{2.5} that warms the climate. Consequently, fuelwood stoves are an important source of ambient (outdoor) air pollution, as well as indoor air pollution through either direct exposure or infiltration from outside. WHO²⁹² links emissions from wood heating to serious health effects such as respiratory and cardiovascular mortality and morbidity, in particular for children. WHO estimates that in Central and Eastern Europe, for example, wood combustion accounts for 20–30% of local heating-season ambient PM_{2.5} levels in particular in rural areas where wood combustion is the only major wintertime source of particulate air pollution. While in Georgia there is no ongoing permanent monitoring of PM fractions, the data from two existing PM monitoring stations are alarming: the amount of particle emission in the air often exceeds the norms for 2-3 times. It should be mentioned, Georgia uses the EU norms, as Pm_{2.5} - 25 µg/m³, which is higher than the recommendations set by WHO standards.²⁹³

Domestic hot water (DHW) is gained by the use of two additional energy sources, bottled gas and electric boilers, which represent 17% and 19% of the total energy demand used for DHW, respectively. Most of the water still is heated by the combustion of fuelwood (34%); the second-largest share is provided by natural gas from the grid (30%) as can be seen in Figure 45. For most

²⁹² http://www.euro.who.int/__data/assets/pdf_file/0009/271836/ResidentialHeatingWoodCoalHealthImpacts.pdf

²⁹³ http://greenalt.org/wp-content/uploads/2016/10/Ambient_Air_Quality_Challenges_2016.pdf.

of the households it is not easy to clearly distinguish between fuelwood use for space heating and for DHW heating, as in many cases a pot with water that is to be heated is placed on the heating. Resources for cooking energy are comprised of three energy carriers: fuelwood (49%), natural gas from the grid (29%) and bottled LPG (22%). Electricity plays a minor role with a share of 4% of total energy demand and is neglected for the following considerations.

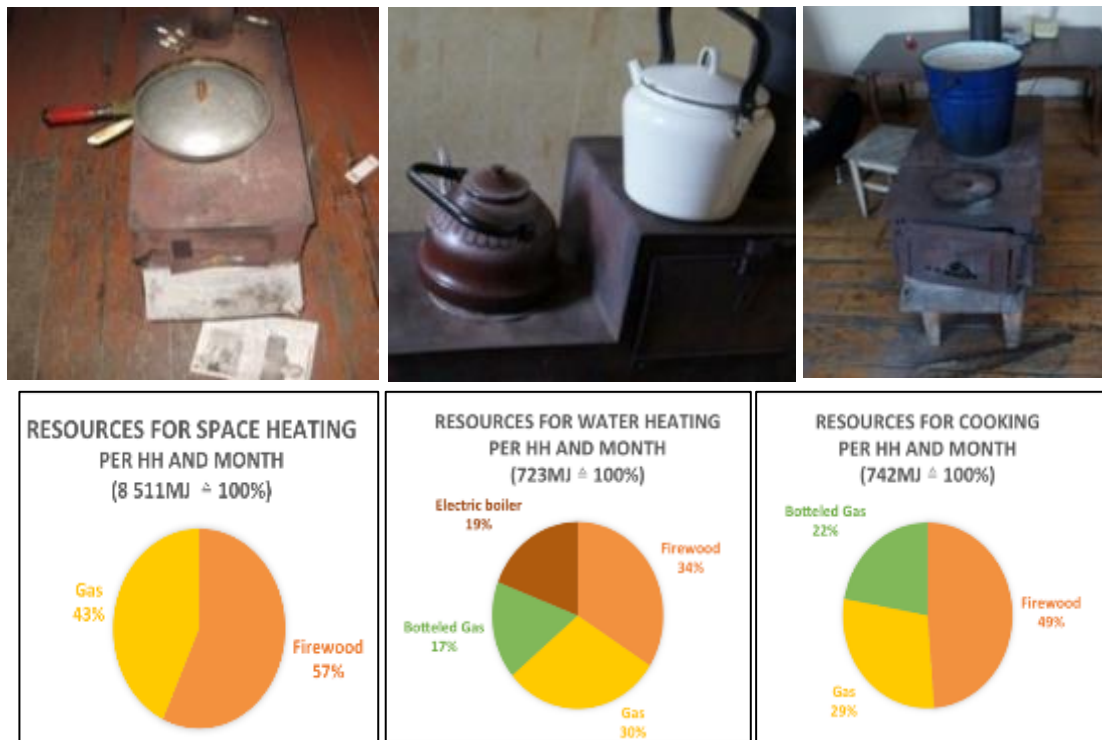


Figure 45: Top: Cooking on inefficient wood stoves. Bottom: Resources for space heating, water heating and cooking per household

Source: Helbig 2016²⁹⁴

Building characteristics: Rural households predominantly reside in single-family, stand-alone houses characterized by very poor thermal performance. The majority of houses in Georgia are built without thermal insulation, so they lose large amounts of the heat that is provided by the wood stoves. Estimates of the heat loss reach up to 70-80% in uninsulated dwellings.²⁹⁵ However statistically reliable tests do not exist for rural Georgia, except for a few geographically limited surveys and studies. For instance, the survey conducted in the municipalities of Dedoplistskaro and Akhmeta (Kakheti region) showed that 86% of the households did not have any form of energy efficient measures; of the remaining 14%, only 11% have insulated windows. Reduction of heat losses through the windows is an important but far from sufficient to reduce heat demand since windows constitute only up to 25% of total wall area in the whole building geometry. Just a few households (3%) have insulated the shielding of their house, such as the roof, walls, door or terrace. According to the National Energy Efficiency Action Plan (NEEAP) of Georgia, there no available information about specific energy consumption (SEC) of residential buildings

²⁹⁴ Helbig 2016.

²⁹⁵ WEG (2011) Design of building envelope insulation, with external appearance of the building.

and those few energy audits which have been conducted show rather high SEC, over 200 kWh/m².

It is important to note that if buildings were more energy efficient then it is likely that some of the theoretical energy savings would be lost to provide a higher level of heating and thus increase comfort of living. Under-heating is widespread in rural Georgia: 88.6% of rural families heat less than 50 m² of living space and 50.5% - less than 20m²(!) – see Figure 46, while there are only 6.2% of the dwelling with area of less than 20m². Overall, it is assumed in this FS, based on the findings of the various studies that average household heats 40m² or 25% of the total living area during maximum 14 hours a day in winter season.²⁹⁶

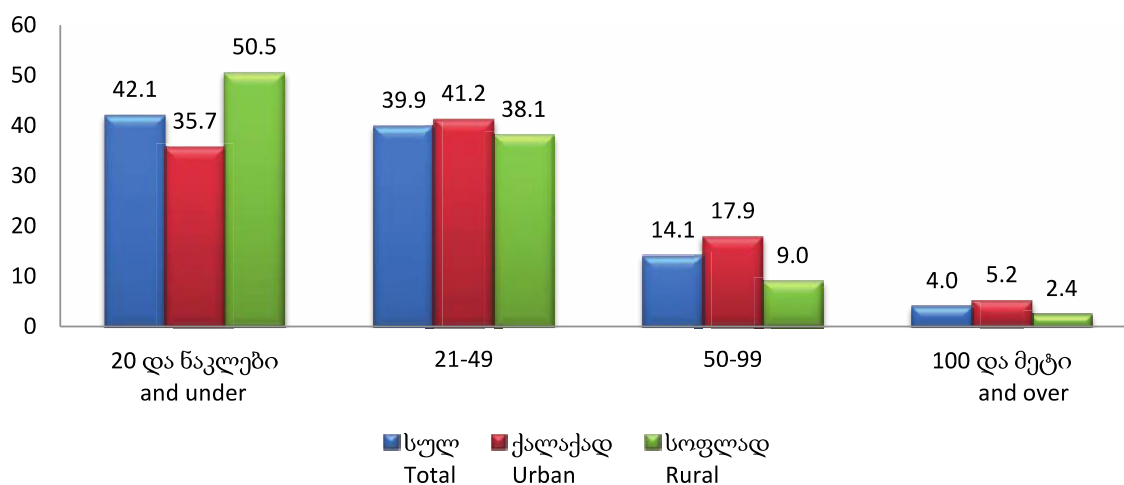


Figure 46: Structure of dwelling by heating space

Source: GEOSTAT 2017

Fuelwood quality. Even though estimated fuelwood consumption is very high for Georgia, its energy value is not as high due to the fact that most of the fuelwood users consume newly cut wood. The fuelwood is mostly bought either shortly before or during the heating season when need is at its highest. More than 90% of the fuelwood is used within the first three months after the purchase – burning moist/damp wood significantly decreases energy-efficiency. The freshly harvested fuelwood is burnt directly, after a too short storage time, resulting in an energy conversion that is far from optimal. The moisture content of wood changes the calorific value of the latter by lowering it. The net calorific value (NCV) of oven-dry wood of different species varies within a very narrow interval, from 18.5 to 19 MJ per kg²⁹⁷. According to GIZ-supported research,²⁹⁸ the fuelwood is commonly burned with water content of 30-40%, well above the ideal of 15-20%. For the purpose of this FS, we use Geostat official figure of 7,800 MJ/m³, which is considered conservative and in line with international benchmarks for NCV at 35% humidity level (see Table below).

²⁹⁶ GEOSTAT 2017.

²⁹⁷ FAO 2015.

²⁹⁸ Helbig 2016.

Table 25: Estimates of active fuelwood users in Guria, Mtskheta-Mtianeti and Kakheti²⁹⁹

	Active Households	Gasified HHs	Active fuelwood users	
			Non-gasified	Gasified HHs using only fuelwood
Guria	32,366	12,799	19,567	6,261
Mtskheta-Mtianeti	35,297	20,842	14,455	7,455
Kakheti	92,732	71,433	21,299	33,397
Total	160,395	105,074	55,321	47,113
Combined total			102,434	

Info Box 8: Social situation³⁰⁰

Nationally the unemployment rate is 12.7%, largely influenced by the high unemployment rate in Tbilisi (24.7%). All project districts have an unemployment rate lower than the national average, with unemployment rates of 2.7% in Guria, 7.8% in Mtskheta-Mtianeti, and 3.7% in Kakheti. While there are comparatively low unemployment rates in the region, household income is lower than the national average of GEL 993/month. The monthly average income in the project regions is as follows: Guria (GEL 547), Mtskheta-Mtianeti (GEL 795), and Kakheti (GEL 554).

In the project region, 11% of households in Guria, 23% in Mtskheta-Mtianeti, and 38% in Kakheti are considered low-income households (23,746 households in total). Local municipalities have a system where low-income households are provided with targeted government assistance, based on a proxy means test to identify the poorest households.³⁰¹ Of the poorest 20% of Georgian households, around 25% receive financial assistance and other targeted assistance from the state (e.g. free or highly-subsidized fuelwood).³⁰²

In terms of social and economic vulnerability, households living in remote mountainous regions are more vulnerable. The government has allocated GEL 69 million for programs implemented under the mountain law,³⁰³ that targets socially and economically vulnerable groups in mountainous regions.³⁰⁴ Through this initiative, 11,923 households who permanently live in mountainous regions had fuelwood delivered, and 84,000 permanent households received 50% off their monthly energy bills.

Changes in fuelwood prices, the phasing out of the social wood policy, and increasing supervision may have a disproportionate impact on these groups, and coordinated support is needed to mitigate the social risk for these groups. However, a challenge for engaging such groups in the project (e.g. providing them with an improved EE stove), is that their wellbeing/ vulnerability ranking could change due to the investment, resulting in their removal from the vulnerable household list and ultimately preventing them from accessing social services.

²⁹⁹ CENN 2016.

³⁰⁰ Statistics from GEOSTAT unless cited otherwise.

³⁰¹ Bertelsmann Stiftung 2019.

³⁰² 28% of the poorest 20% of households did not ask for assistance; Bertelsmann Stiftung 2019; Exact figures differ per municipality.

³⁰³ Law of Georgia on the Development of High Mountainous Regions (2016); <http://georgiatoday.ge/news/14889/Bakhmaro-Settlement-to-Benefit-from-Mountain-Law>.

³⁰⁴ The law aims at ensuring "equal socio-economic development of the entire territory of Georgia and at solving the social and economic problems of persons living in" high mountainous regions.

Summary

All in all, an overview of the fuelwood consumption in Georgia's rural areas has identified the following major characteristics of demand:

- Households (HHs) are responsible for the dominant (over 95%) share of fuelwood consumption;
- HH energy demand can be represented as three components: heating, cooking, hot-water preparation with heating accounting for largest share (78%);
- While most of households (81%) have access to various energy carriers, such as natural gas, electricity, liquid fuel, fuelwood, the vast majority (78%-95%) rely predominantly on fuelwood for heating. In addition, 65% of households use fuelwood for hot water preparation and 43% for cooking. However, due to relatively low share of these usage categories in HH energy consumption (14%), relatively small saving potential and difficulties with obtaining reliable estimates, they are excluded from the analysis of fuelwood demand and saving potential;
- Under-heating or suppressed demand³⁰⁵ is common in rural Georgia with households on average satisfying only 25% of their need for space heating;
- Low thermal characteristics of rural houses, low efficiency of conventional wood stoves along with poor quality of fuelwood are the key determinants of high fuelwood demand by HHs.

Project level

In the target region (all 14 districts), the demand for fuelwood is around 725,156m³ per year (Table 26).³⁰⁶ Focusing on the project's 8 target districts, the fuelwood demand is 397,114m³ per year.³⁰⁷ However, legally sourced fuelwood for the target regions (all 14 districts) amounted to 177,456m³ in 2017 – demonstrating a clear gap between the legal supply and local demand.³⁰⁸

Table 26: Fuelwood demand in the project's target regions and districts

Region/ District	Required amount of fuelwood (m ³) - CENN 2016 Study
Guria	
Chokhatauri*	30,127
Lanchkhuti*	46,748
Ozurgeti*	81,521
Total Guria	158,396
Mtskheta-Mtianeti	
Dusheti	41,834
Mtskheta	90,840
Tianeti*	15,875
Total Mtskheta-Mtianeti	148,549
Kakheti	

³⁰⁵ Suppressed demand is the situation where energy services provided are insufficient – due to poverty or lack of access to modern energy infrastructure – to meet the needs of stakeholders given their human development needs.

³⁰⁶ CENN 2016.

³⁰⁷ Ibid.

³⁰⁸ NFA Regional Profile, unpublished.

Region/ District	Required amount of fuelwood (m ³) - CENN 2016 Study
Sagarejo	53,942
Dedoplistskaro*	36,596
Sighnaghi	40,292
Lagodekhi	55,759
Gurjaani	62,721
Kvareli*	39,934
Akhmeta*	46,179
Telavi*	82,788
Total Kakheti	418,211
TOTAL - All project regions	725,156
TOTAL - Project target districts*	397,114

Note: The project's target districts are marked with *

Source: CENN 2016

Assuming average annual fuelwood consumption by rural household of 8 m³, the total number of households (HHs), active fuelwood users, is 90,700 households. This estimate is consistent with the findings of the assessment of the fuelwood consumption undertaken by CENN for the whole of Georgia, including for the regions of Guria, Mtskheta-Mtianeti and Kakheti. Based on the CENN methodology, the number of active fuelwood users in the target regions stands at 102,434. It is therefore plausible to assume that **100,000 households fully depend on fuelwood** for their heating and other energy needs **in the target regions**; of those 55% are non-gasified, i.e. households without no alternatives to fuelwood.

Based on the analysis of fuelwood consumption patterns, a fuelwood demand model has been developed to estimate primary and final heat demand in the three target regions of the project in the baseline, as well as fuelwood saving potential (see Chapter 5.2.3.4). Table 27 presents key inputs, assumptions and results.

Table 27: Inputs, assumptions, calculated primary and final heat demand in three target regions

Parameter	Unit	Value	Source
Number of households using fuelwood for heating	#	100,000	Average based on CENN 2016 data
Volume of fuelwood consumption by household	m ³	8	Average based on multiple studies
Baseline energy efficiency of conventional stove	%	35%	Based on testing of conventional stoves in Georgia ³⁰⁹
Net calorific value of fuelwood	kWh/ton	3,163	Geostat
Area of heated space per household	m ²	40	GIZ 2016
Number of hours of heating	Hours/day	14	Geostat 2017
Fuelwood expenses per household	GEL/year	400	Average based on various studies
Primary energy consumption (fuelwood) for heat supply in target regions	kWh/year	1,733,000	Calculated
Primary energy consumption (fuelwood) for heat supply per household	kWh/year	17,333	

³⁰⁹ Lazashvili (2012) Energy and Economic Reasoning of Large-scale Implementation of Energy Efficient Living Stoves.

Parameter	Unit	Value	Source
Final energy demand in target regions (25% comfort level)	kWh/year	606,700	
Final energy consumption in target regions per household (25% comfort level)	kWh/year	6,067	
Specific energy consumption (SEC)	kWh/m ²	260	
Energy price (fuelwood)	GEL/kWh	0.02	

In the baseline, an average rural household receives 6,067 kWh per year of useful energy for heating, which is sufficient to cover 25% of its heating needs and translates into the specific energy consumption (SEC) of 260 kWh/m² and fuelwood price of GEL 0.02/kWh. These findings are consistent with results obtained through similar studies in Georgia. For example, GERES (2012) put an average SEC value of a Georgian house at 290 kWh/m²/yr (Figure 47), while the NEEAP assumes specific heating demand of the fuelwood heated rural house to be 250 kWh/m² in the BAU case. Comparison of prices of various energy carriers in Georgia (Table 28) shows that fuelwood is by far the cheapest of the available alternatives to households and therefore, also in view of the widespread poverty, is the most commonly used source of heat supply to population.

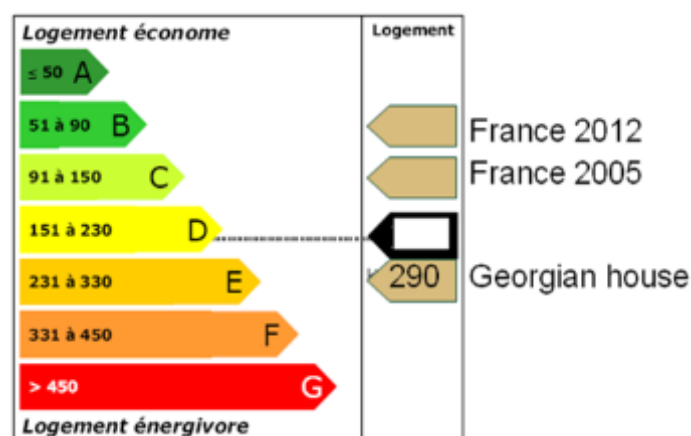


Figure 47: Energy efficiency class of a Georgian house

Source: GERES 2012, quoted in WECF 2018

Table 28: Comparison of energy prices for households

GEL/kWh	Fuelwood	Natural gas ³¹⁰	Electricity (min tariff) ³¹¹
Energy price	0.02	0.05	0.13

5.1.3.2 Demand for (commercial) timber

National level

While commercial logging is responsible for fewer wood removals than fuelwood, it still comprises around 18-22% of national wood removals.³¹² The demand for commercial/industrial timber for primary processing was within the range of 480,000 – 660,000m³ in 2014, which was met by primarily by domestic sources (in particular concessions), and to a lesser extent wood imports (see Figure and Table below).

Table 29. Overview of commercial timber demand and supply in Georgia

Demand for commercial timber (m ³) ^a	Volume of commercial timber from concessions (m ³) ^b	Volume of commercial timber Imported (m ³) ^c	Volume of commercial timber illegally harvested (m ³) ^d
480,000 - 660,000	175,360m ³	23,300	~300,000 - 480,000

Sources: a,c,d: Garforth et al. 2016; b: State Audit office 2016b

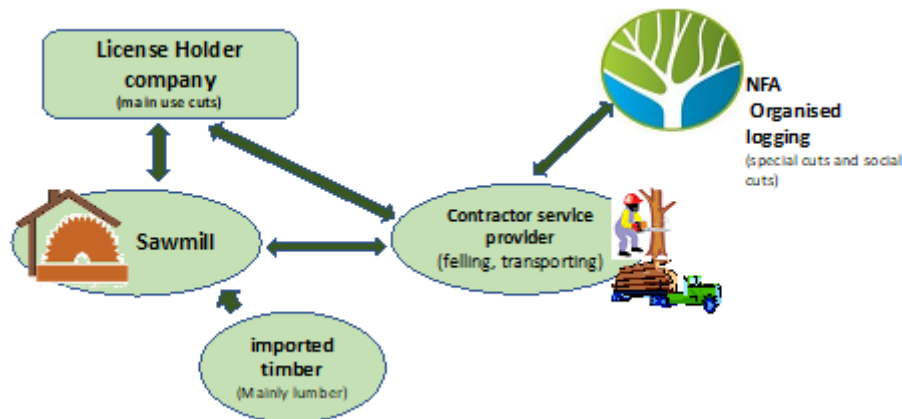


Figure 48: Interrelationship between license holders, sawmills, service providers and NFA.

Source: State Audit Office 2016b

³¹⁰ <http://www.agenda.ge/en/news/2018/2758>.

³¹¹ <http://georgiatoday.ge/news/8668/Georgia-to-See-Increased-Electricity-Tariffs-From-2018>.

³¹² Illegal harvesting of commercial timber reported by Garforth et al. (2016) was within the range of 63-72%.

Domestic (commercial) timber supply

In 2014, Georgia's timber industry required between 480,000-660,000 m³ of timber from domestic sources, of which between 63-72% was illegally sourced.³¹³ However, the figure may also be higher, as there is a large number of illegal sawmills in the country.³¹⁴ Commercial logging in Georgia is carried out by license holders (see Figure below).³¹⁵ In 2013, commercial timber extraction was limited to 70 concessions operated by Georgian, Chinese, and Turkish companies, covering 166,654 ha, and producing around 175,360m³ per year.³¹⁶ In 2019 the area under concessions was 145,000 ha, due to licenses expiring and due to the cancelation of licenses due to violations (see Info Box below).

Commercial timber extraction operations are not performed on sustainable forest management principles. Licenses have been approved for companies without forest inventories, often resulting in often over-estimations of the amount of timber available for harvesting.³¹⁷ In addition, FMPs elaborated by license holders do not consider sustainable management practices, and focus primarily on the economic value of forests. The State Audit Office found in a 2016 report that most FMPs for concession areas do not consider measures for restoration or biodiversity, and often information about forest protection and fire safety are not clearly defined with concrete actions for implementation or monitoring.³¹⁸

The concession system is expected to be phased out by 2028, which has increased uncertainty over the supply of commercial timber for private sector actors. Under the new NFA management system, NFA will be responsible for the provision of sustainably produced timber for the sector (see Chapter 5.2), and NFA needs to provide confidence to the sector that sufficient volumes of wood can be sustainably harvested to meet the sector's demand for domestic timber from legal supply chains.

Info Box 9: Degradation in concession areas

In 2019, two licenses were revoked from forestry operations in the districts of Tianeti and Akhmeta. DES found the responsible license holder to be in violation of their contract, noting various environmental violations. Such stories are common in concession areas, which contributed to them being phased out. Results of Department of Environmental Supervision monitoring demonstrated that 44 out of 46 licensees were engaged in illegal logging and committed other violations according to the State Audit Report. An example of a flaw is lack of forest protection, care and restoration activities: the management plans do not identify the amount and species of trees to be restored, care and maintenance measures.³¹⁹ Following violations by licensee were identified: illegal logging, pollution of the forest area by the remnants after the felling, incorrect allocation of felling areas and the disruption of forest frequency.³²⁰ These illegal activities and violations of licensees contribute to the degradation of forests and forest ecosystems and hinder sustainable forest management.

³¹³ Garforth et al. 2016.

³¹⁴ Garforth et al. (2016) mentioned that half of the existing sawmills and 35% of existing sawmill capacity may be illegal.

³¹⁵ See Chapter 5.1.3.3 on the policy challenges associated with the flawed concession system.

³¹⁶ State Audit Office 2016b; By 2015, this had been reduced to 38 licenses, however the reduction in the volume harvested is not known.

³¹⁷ Ibid.

³¹⁸ Ibid.

³¹⁹ State Audit Office 2016b.

³²⁰ Ibid

Chapter 5.1.3.4.2 below provides a more detailed description on the challenges associated with the concession system, as well as upcoming policy and regulatory changes.

Timber imports

An average of 23,300m³ of wood, primarily lumber, is imported per year for primary processing, majority of which is from coniferous species (see Appendix 5 for additional Figures on coniferous and non-coniferous primary processing balances).³²¹ Imports are primarily from Turkey, China, Russian Federation, Ukraine and Germany.³²²

Primary Processing

Primary processing is carried out at sawmills. There is no publicly available data on the overall number of sawmills operating in Georgia and their processing capacity. Experts interviewed noted that on average sawmills in Georgia work at only 50% of their capacity, primarily due to insufficient timber supply.³²³ In the past, higher quality timber has not always been appropriately sorted, resulting in higher quality timber being utilized for fuelwood at times, exacerbating the need for commercial timber at sawmills.

Sawmill owners have noted that Georgian timber is often low quality, which limits value adding opportunities. On the other hand, in the Georgian market people rather consume low quality timber at low prices, further limiting the profitability of sawmills. Nonetheless, there is substantial potential for the sector to grow if the timber supply increases.³²⁴

Info Box 10: Sawmills as a hotspot for illegality

In general, sawmills have been a hotspot of illegal activity in the past, due to challenges in monitoring the source of timber utilized. Recognizing this challenge, the Government made the installation of cameras mandatory in sawmills and has developed an “Electronic System of Timber Resources Management” which aims to improve transparency in tracking timber throughout the value chain (see Figure below). The first steps are already effective and operational (from license holder to sawmills), additional work is needed to ensure the compatibility of DES’s system with that of Revenue Services (see Chapter 5.2).

³²¹ Garforth et al. 2016.

³²² Ibid.

³²³ Interviews included forest sector experts, and sawmill owners in the target regions and in Tbilisi.

³²⁴ Improvements in timber quality could also lead to new opportunities for the timber processing industry.

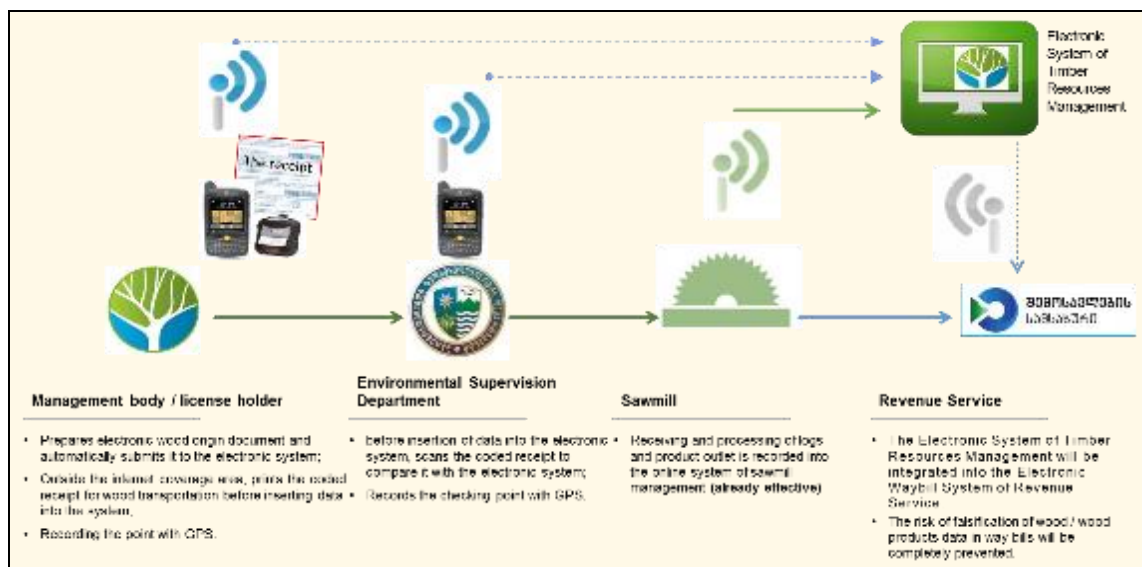


Figure 49: Overview of Electronic System of Timber Resources Management

Source: DES 2018, unpublished

Project level

Within the target regions, 39,466 ha of concessions are present that will be terminated by 2028. Together, these licenses permit for the extraction of 44,725 m³ of timber per year, however in practice the legally harvested quantities are lower. In 2017, only 34,586m³ of commercial timber was legally harvested from the project regions. An additional 70,584 m³ was likely illegally harvested, as nationally it was estimated that between 63-72% of commercial timber is illegally harvested.³²⁵

There are 34 registered sawmills in the project area, with a combined processing capacity of 107,800 m³ per year (see Table below). Majority of sawmills belong to license holder companies or are associated with them as a primary timber resource supplier. Sawmill owners and forest sector experts interviewed for the private sector assessment, conducted during project preparation, estimate that they are working at around 50% of their capacity.³²⁶ The private sector assessment found that in some cases sawmills did not have a sufficient legal supply of raw materials.

Stakeholder interviews found that the limited local timber supply reduced was partly responsible, as well as the low quality of locally produced timber. Some large sawmills interviewed noted that they partly compensate for the lack of timber supply by purchasing imported wood, mainly from the Russian Federation and Turkey. Nonetheless, as with the national level there is a clear gap between the demand from the industry, and the available domestic supply, where illegal logging is conducted to help meet industry's demand.

³²⁵ 2017 legal value from NFA, illegal estimations based on the national % of illegal commercial harvesting found by Garforth et al. 2016, where ~63-72% of commercial timber removals were illegal (assuming an average of 67%).

³²⁶ To what extent sawmills are working at reduced capacity is not clear, as the interviews may have reflected only the processing of legally harvested timber – as tracked and recorded. On the other hand, since 2017 various efforts have improved transparency in sawmills, in particular the Electronic System of Timber Resources Management, that may have led to reduced capacities due to increased difficulties to cover up illegally sourced timber.

Table 30: Estimated annual cutting capacity of sawmills in the project regions

Region	Number of (legal) sawmills	Estimated annual capacity (m ³)
Kakheti	17	65,800
Guria	12	28,600
Mtskheta-Mtianeti	5	13,400
Total	34	107,800

Source: Own elaboration, based on stakeholder interviews.

5.1.3.3 Inadequate forest management

As described in the previous chapters, Georgia has undergone various periods of intense forest use resulting in degradation and the reduced absorption potential of forests. A major challenge for Georgia is to sustainably manage its forest resources in a manner that restores degraded forests, enhances forests' carbon stocks, and strengthens the resilience of forested areas to climate change.³²⁷ Many studies have noted that without implementation of sustainable forest management, degradation of Georgian forests will continue to prevail, and the sink potential of Georgia's forests declined due to the gradual depletion of the forest carbon stock.³²⁸

This chapter is organized to cover the main issues associated with forest management in the baseline scenario, namely:

- The lack of forest management plans and forest inventories, and
- Inadequate forest management activities (including activities for reforestation, forest infrastructure [access roads and skidding trails], and harvesting).

5.1.3.3.1 Lack of Forest Management Plans (FMPs) and forest inventories

National level

One challenge for forest management in Georgia in general is the lack of up-to-date inventories and forest management plans. Forest inventories in Georgia are outdated, with many conducted 20-30 years ago, resulting in a very limited information based on the status and quality of forests in Georgia.³²⁹

In the absence of up-to-date inventories and FMPs, majority of forest districts have been managed by short-term (often ad hoc) forest utilization plans, often independent of forest stand conditions. Such practices put forests at risk of unsustainable management, particularly unsustainable harvesting levels that are not aligned with forest conditions and growth rates. Such practices will not only inhibit forest regeneration and recuperation, but often result in accelerating forest degradation.

³²⁷ Patarkalashvili 2016.

³²⁸ Olofsson 2010; USAID 2017; In addition, baseline information generated for this report described in Chapter 5.1.1 provides further insight into these trends.

³²⁹ Garforth et al. 2016.

Info Box 11: Recent processes to support new FMP development and implement a National Forest Inventory

Recognizing that the lack of up-to-date FMPs puts the country's forest resources at risk, the Government has slowly began developing updated FMPs. Regular management-level inventories were introduced in 2013 for the elaboration of 10-year forest management plans. By 2018, a total of 367,940 ha was covered by management plans (13% of the total forest area).

In addition, the Government initiated the National Forest Inventory (NFI) in 2015. The NFI aims to:³³⁰

- Provide Georgian political and strategic decision makers with reliable information about Georgian forests
- Improve reporting on the national, regional and global level
- Provide reliable data on the quality and quantity of Georgian forests
- Establish a permanent network for the continuous monitoring of forest characteristics
- Strengthen research and research institutions.

The NFI aims to provide different levels of information (country, regional level, etc.), including information on (for example): Growing stock (m^3 and m^3 per ha), species composition, age class distribution, site index and timber increment, overall forest structure (e.g. origin, quality/ status, regeneration, forest types, etc.), forest biodiversity aspects (e.g. habitat trees, deadwood, standing deadwood, etc.), volume of carbon stored in Georgia's forests, area of forest cover (ha, and percentage), information to develop maps (incl. forest/ non-forest areas, rough forest type classification – e.g. coniferous, broadleaved, mixed, etc.). Results from the NFI (supported by the German government via GIZ) are expected at the end of 2020.

Project level

In the project's target districts, the last inventories were conducted in the period from 1987-1995 (

³³⁰ Torchinava 2017.

Table 31). Furthermore, information gaps create further inefficiencies and gaps in planning and management, as described above.

In the project’s target regions, four FMPs are underway: three in forest districts in Guria (Lanchkhuti, Chokhatauri and Ozurgeti), and one in forest district in Kakheti (Akhmeta). For these regions a Forest Management Inventory is being conducted to inform FMP development. Preliminary results from Chokhatauri and Lanchkhuti were available, and informed the forest model developed for the project (see Chapter 5.2.3.4 for more detailed information on the modeling approach, data and assumptions).

Table 31: Information on inventories and management plans for forestry districts in Guria, Mtskheta-Mtianeti and Kakheti

Region	Forestry Districts*	last completed inventory (year)	Updated forest management plan?
Guria	Ozurgeti-Lanchkhuti	1995	Ongoing - 2019
	Chokhatauri	1987	Ongoing - 2019
Mtskheta-Mtianeti	Mtskheta	2006	No
	Barisakho	1986	No
	Pasanauri	1986	No
	Tianeti	1991	No
	Akhalgori	1995	No
Kakheti	Akhmeta	1992	Ongoing - 2019 or early 2020
	Telavi	1992	No
	Kvareli-Lagodekhi	1989	No
	Sagarejo-Gurjaani	1993	No
	Signagi-Dedoplistskaro	1990	No

*Note – with the new (draft) forest code FMPs will be developed at the district level, and the system of forestry districts (often combining 2 districts) will be discontinued. For the project this means Ozurgeti, Lanchkhuti, Kvareli, and Dedoplistskaro will all have their own individual FMPs.

Source: NFA, unpublished

5.1.3.3.2 Inadequate forest management activities

Linked with the lack of forest management inventories, forest management plans and national forest inventories, as well as limited budgets and capacities, forest management activities have been inadequate in terms of practices and scale.³³¹ The following paragraphs will go into the challenges associated with: reforestation and sanitary cuts, forest infrastructure (especially forest access roads and skidding trails), and cutting operations.

Reforestation and sanitary cuts

National level

While NFA has realized the importance of such measures for improving forest management, a major challenge has been limited technical capacities, and limited budget. From 2008-2013 no forest maintenance activities (e.g. sanitary cuts, control of pests and diseases, management of forest fires) were carried out. During the period from 2015 to 2017, NFA was able to increasingly invest in such measures, including the following activities/ investments to support reforestation and improved sanitary conditions:³³²

³³¹ World Bank 2019; Patarkalashvili 2016.

³³² NFA 2018.

- Treatment of pest-infected and diseased forest stands of up to 27,000 ha with aviation control methods (Kvemo Kartli and Mtskheta-Mtianeti regions)
- Treatment of 500 ha of stands in Guria affected by *Buxus colchica*, Samegrelo Zemo Svaneti, Imereti, Racha-Lechkhumi and Kvemo Svaneti regions (500 ha)
- Informative warning banners were placed in fire hazard areas
- Regional forest offices were equipped with basic fire extinguishing equipment.
- Protection fire lines have been established to prevent the spreading of forest fires especially from agricultural areas and negotiations with the responsible institutions to regulate the burning of agricultural fields
- 11 new temporary nurseries were established in different regions
- Afforestation and reforestation measures were carried out on 330 ha
- Measures for promoting natural regeneration have been implemented on 62,8 ha, and
- Fast-growing plantations were established on 62 ha.

Considering total forest area under NFA management of 1.8 million ha, the rehabilitation activities are minimal. Most forests in Georgia are of natural origin, and natural reforestation is stated as the main strategy of reforestation. Enrichment planting and measures to support natural regeneration is not needed in the total forest area, but mainly in degraded forest areas.

Project-level

As observed at the national level, investments in reforestation, and forest regeneration have lagged due to underinvestment in the project region (Tables 32 and 33). Only 3.4 ha were reforested in the three project target regions from 2013 to 2017. As a result, inadequate management contributes to the conservation of degraded, low quality forests with low levels of timber production and the declined function of other key ecosystem services.

Table 32: Overview of NFA supported activities related to reforestation, restoration and afforestation in the project's target regions from 2015-2017

Region	Nursery (ha)					Planting (ha)					Support of natural regeneration (ha)					Fast-growing plantation (ha)				
	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017
Kakheti	0	0.18	0	0.2	0.2	0	0	0	0	0	0	0	0	0	0	0	0	6.6	23.6	0
Mtskheta-Mtianeti	0	0.3	0	0	0	0	0	0	0	2.4	0	0	0	0	0	0	0	0	0	0
Guria	0	0.46	0	0	0	0	0	0	1	0	0	0	0	18.2	0	0	0	0	0	0
Total	0	0.94	0	0.2	0.2	0	0	0	1	2.4	0	0	0	18.2	0	0	0	6.6	23.6	0

Source: NFA, unpublished

Table 33: Overview of NFA planned activities related to reforestation, restoration and afforestation in the project's target regions in 2019

Region	Nursery (ha)	Planting (ha)	Support of natural regeneration (ha)	Fast-growing plantation (ha)
Kakheti	0.2	0	0	15
Mtskheta-Mtianeti	0	0	0	0
Guria	0	3	5	0

Source: NFA, unpublished

Investments in forest infrastructure

National level

Under-investments in forest sector infrastructure, in particular forest roads, are a major limitation for the sustainable management of forest resources in Georgia.³³³ Without roads and skidding trails, harvesting can only be concentrated on accessible areas – which can lead to overharvesting if insufficient areas are accessible.

One study noted that in the 1980s there were 1.14m of dirt roads per hectare of forest, which was extremely low compared to other European countries at that time, who had 1,000-2,000m of road (often hard covered roads) per hectare of forest – however a key difference is Georgia's mountainous terrain.³³⁴ While official statistics in Georgia are not available, experts have estimated that current forest road infrastructure is equivalent to 3m/ha of forest, and skidding road infrastructure 9m/ha.³³⁵ In comparison, in terms of forest access roads countries in Europe range from 10-30m/ha.³³⁶ Experts have further estimated that forest skidding roads in Georgia³³⁷ should cover at least 47m/ha to enable the implementation of SFM.

Investments in forest roads has lagged in Georgia, primarily due to the lack of budget and lack of prioritization of the sector. From 2006 to 2012, no forest roads were rehabilitated or constructed. From 2015 to 2017, only 37 km of roads were constructed, and 213 km of existing roads rehabilitated nationally.

Roads and other forest infrastructure are often constructed in a way that they are prone to damage and often become unusable for large portions of the year. There are limited capacities on building sustainable and resilient forest infrastructure, and equipment used is often outdated and highly damaging to the type of infrastructure constructed.

Project level

In the 3 project regions, only 12.07 km of new forest roads were constructed, and 105.2km of roads were rehabilitated during 2015 to 2017 (Table 34). Many roads are poorly constructed, highly degraded and ultimately limit access into forested areas as many NFA and DES units do not have suitable vehicles.

Table 34: Overview of forest road infrastructure in project regions (new and rehabilitated forest roads) developed between 2015 and 2017

Year	Guria		Kakheti		Mtskheta-Mtianeti	
	New Road (km)	Rehabilitation (km)	New Road (km)	Rehabilitation (km)	New Road (km)	Rehabilitation (km)
2015	0.33	10.57	0	4.02	12.37	21.26
2016	0	11.31	0	0.48	3.58	20.66
2017	0	16.89	0	0	0	18.02

Source: NFA, unpublished

³³³ Patarkalshvili 2016.

³³⁴ Ibid.

³³⁵ Expert consultations in Georgia conducted for project development.

³³⁶ See Chapter 5.2.3.4.3 for a more detailed table with benchmarks and references.

³³⁷ See Chapter 5.2.3.4. for more detailed information.

Cutting Operations (Thinning and Harvesting)

National and target region level

Cutting operations in forests is done using old equipment and often using practices that lead to forest degradation and unnecessary damages. Reduced impact logging is not widely practiced in Georgia due to lack of awareness, budget, equipment and capacities. As a result, inappropriate cutting operations often lead to:

- Damage to surrounding trees and vegetation, higher waste
- Ad hoc harvesting due to the lack of up-to-date inventories and limited available information on forest status
- Damaged timber, leading to lower quality timber and lower prices
- Construction of roads that lead to environmental damage.

In addition, given the high demand for fuelwood, often higher quality timber that could be sold for industrial purposes is used for fuelwood. The use of inappropriate equipment and practices further leads to accidents and injuries.

5.1.3.3.3 Inadequate forest supervision

National and target region level

Forest supervision in Georgia has been inadequate to control the illegal use of forest resources, thought to be the largest driver of forest degradation in the country. According to the available data, the number of illegal logging cases has increased from 1,078 in 2013 to 3,266 in 2015 with estimated GEL 8 million in environmental damage (Table 35).³³⁸ In 2014, government authorities confiscated 49,915 m³ of illegally harvested timber, yet as discussed in Chapter 5.1.2, illegal logging was assumed to be within the range of 2-2.3 million m³ in the same year. Thus, DES was only able to enforce around 2% of illegal logging (in terms of volume confiscated).

Table 35: Illegal forest use cases and incurred damage during 2013-2015.

	2013	2014	2015	2016	2017
Volume of illegal timber confiscated by government authorities (m ³) ³³⁹	6,039	49,915	44,612	28,586	35,022
Number of incidences of illegal Forest Use (#)	1,078	3,507	3,266	N/A	N/A
Damage to the environment (in GEL)	418,284	5,289,147	8,361,019	N/A	N/A

N/A: Data not available

Source: Volume of illegal timber confiscated by GEOSTAT 2019; Number of incidences, and environmental damage data from State Audit Office 2016b

The three project regions have some of the highest reported cases of illegal logging in the country. In the project's three regions, a total of 17,489 m³ was confiscated in 2017 (50% of the timber confiscated from illegal logging by government authorities; Figure 50). When comparing with the data provided in Chapter 5.1.3.1, which estimated that 618,283 m³ was illegally harvested, there was 600,794 m³ of timber removed that was not confiscated by government authorities (97% of the estimated total [legal and illegal] wood removals in the project regions in 2017).

³³⁸ State Audit Office 2016b; DES has reported 2,489 cases of violation costing GEL 4.1 million in environmental damage for 2014 (SESA 2016), a number lower than reported by the State Audit Office (3,507 cases).

³³⁹ GEOSTAT 2019e.

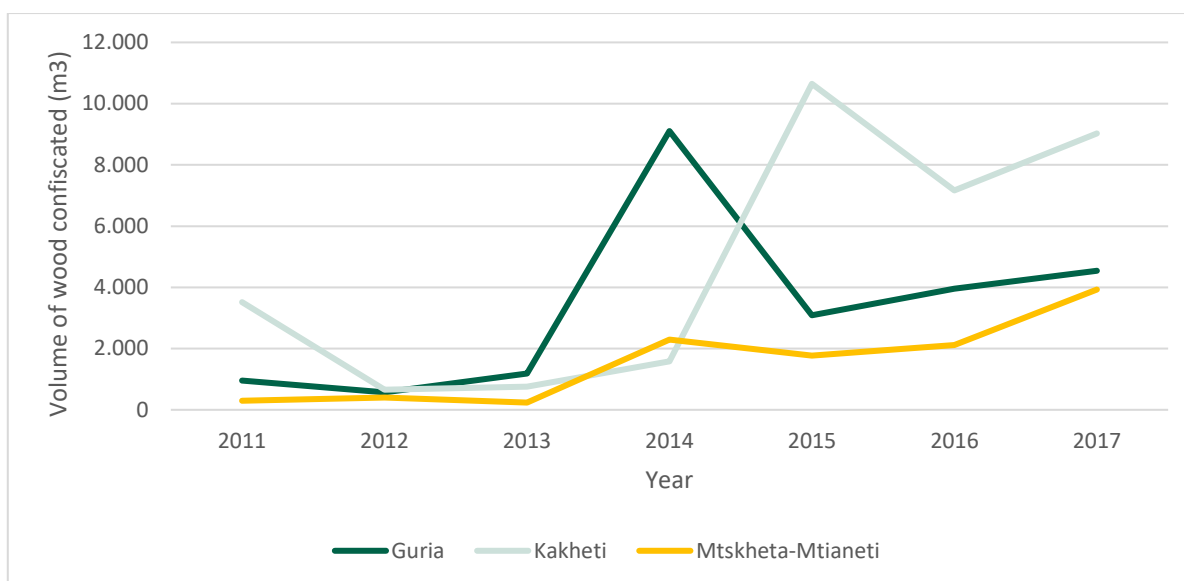


Figure 50. Volume of illegal timber confiscated in the three project regions from 2011-2017

Source: GEOSTAT 2019e

In informing the forest sector reform, DES identified the following major challenges:

- **Insufficient monitoring and incomplete control over the transportation, delivery and primary processed timber products:** A major challenge for forest supervision has been overseeing the chain of custody in the country and tracking timber resources from forests, to sawmills, to secondary timber industry or final use.
- **Limited financial resources, staff, equipment and capacities of forest supervision:** DES does not have sufficient staff to ensure the efficient and effective control over forest resources. In 2018, there were 411 staff working in DES, majority of which worked in Environmental Patrolling and Urgent Response Division within DES regional units. Their duties related to all environmental supervision, and even then, considering the project regions there would be only an average of 1 environmental patrol responsible for 9,608 ha of forest in Guria, Mtskheta-Mtianeti and Kakheti –likely an understatement since all of these patrols oversee other environmental supervision.
- **Inefficiency of sanctions:** The Government of Georgia have noted that current sanctions are not sufficient to reduce forest degradation and deforestation.³⁴⁰ As noted above, approximately 75% of wood removals are illegal. In 2017, DES reported that only 15,689.83m³ was illegally harvested, reflecting the volume of timber confiscated by DES, and associated with sanctions/ fines. Considering that nearly 2-2.3 million m³ was harvested in 2016, this figure seems extremely low. Sanctions are likely too low to prevent most people from illegally harvesting, and another challenge is incomplete control and insufficient law enforcement.
- **Existence of unregistered sawmills:** In the past it was difficult for DES to track timber in sawmills, where substantial illegally sourced timber was processed.
- **Inadequate equipment to enable efficient and effective supervision:** Equipment is limited to the bare minimum (uniforms, flashlights), and investments in advanced equipment and technology is often not possible due to available department budgets. For instance, DES Vehicles are often not suitable for forest roads, which are in poor condition due to the use of non-resilient and unsuitable

³⁴⁰ MoENRP and NFA 2014.

construction practices. DES also received some budget for camera traps, that have improved supervision along forest roads, the budget only covered cameras with a link to existing cellphone networks (i.e. not satellite internet), that limited where cameras could be installed. Thus, while important to show the potential of such technologies, given much of Georgia's forests are located in more remote areas without reliable network coverage – the 'cheapest' technology is not effective for much of Georgia's forest area. The lack of suitable equipment and technology creates further strains on forest supervision, considering low staff numbers (described above, and within Chapters 5.2.3 and 5.2.4).

The country's forest sector reform has acknowledged these challenges and introduced targeted approaches to try and improve them (see Chapter 5.2.3.2 for further information).

5.1.3.4 Policy gaps and inefficiencies

5.1.3.4.1 Social Wood Program

Georgia's social wood program³⁴¹ was introduced in the 2000s to address energy poverty and economic crisis, ultimately providing the rural population with an affordable supply of fuelwood.

Households register as timber users at the municipality level, and purchase fuelwood harvesting permits (hereby referred to as 'social tickets'), from NFA that allow the recipients of social tickets to harvest fuelwood in an area allocated by the NFA regional (see Figure below). The price per cubic meter is GEL 6/m³, which includes the official fee for harvesting the natural resource (GEL 3), and a service fee (GEL 3).³⁴² In 2014, the government of Georgia made amendments to the Regulation #242 to set a maximum amount of 7m³ of fuelwood per household per year and 15m³ to the households living in high mountainous areas.³⁴³ The average consumption is around 8m³.

³⁴¹ Social cutting is regulated in the current Forest Code via order No. 4677 "On Changes to Georgian Forest Code" (May, 17, 2011) that sets out the implementation arrangements of providing wood for noncommercial purposes to the general population, budget organizations, legal entities of public law, and the Georgian Orthodox Church (Green Alternative 2012).

³⁴² Zeidler and Schachtschabel 2016.

³⁴³ Ibid.

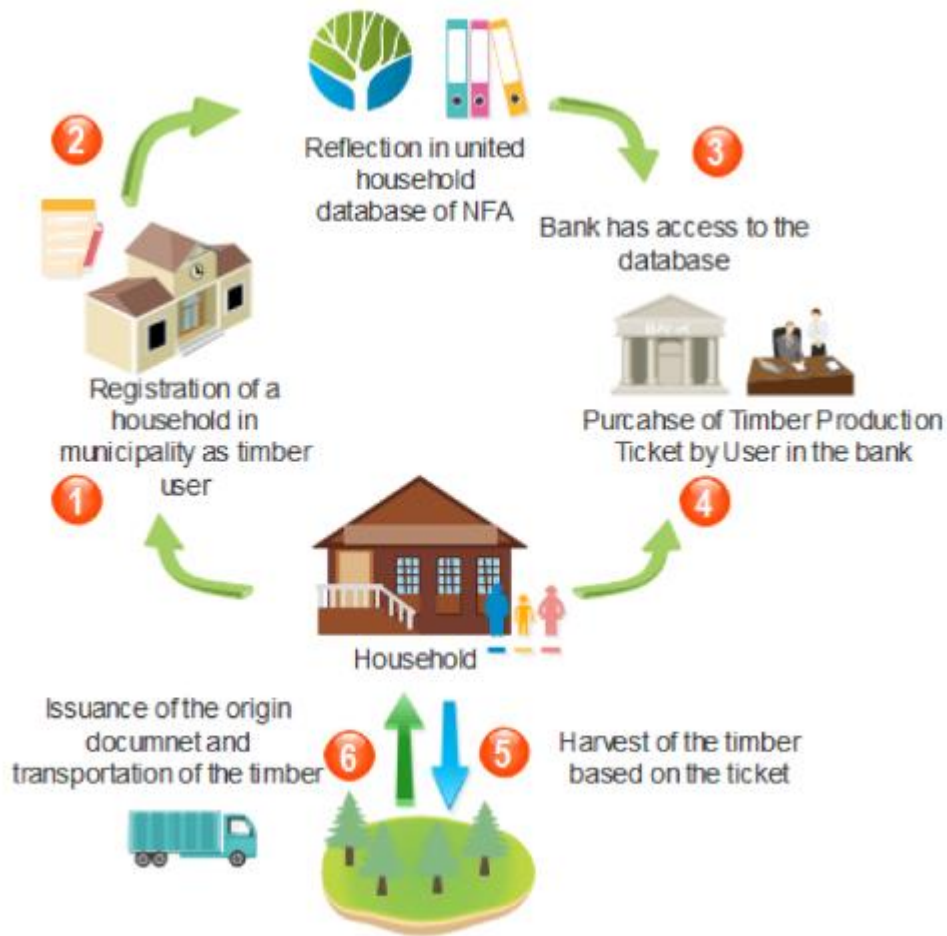


Figure 51: Procedures necessary for social felling of trees

Source: State Audit Office 2016a

Allocation of forest areas for social felling is done without a thorough analysis of the optimal volume of yearly extractable timber at sustainable level, due to the inexistence of up-to-date forest information and lack of FMPs. The State Audit Report (2016b) agreed stating that it is difficult to estimate with confidence both the impact of social felling on the forests and its negative impacts on the environment as the MoEPA and forest management bodies allocate forest resources for the social felling activities without having accurate and exhaustive information necessary for the sustainable management of forests.³⁴⁴ However, as described in Chapter 5.1.2, consumption of fuelwood is 4-8 times higher than legal allocation – resulting in substantial illegality within fuelwood supply chains.³⁴⁵

³⁴⁴ State Audit Office 2016a.

³⁴⁵ Ibid.

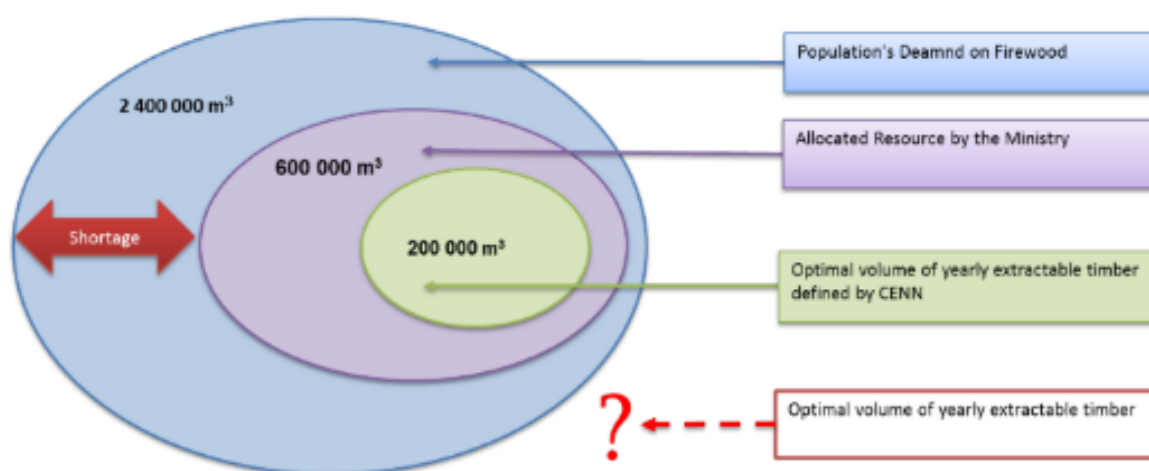


Figure 52: Amount of the shortage and optimal volume of yearly extractable timber³⁴⁶

Source: State Audit Office 2018a

Intermediaries under the social wood system

Under the social wood system, logging is often carried out by ‘intermediaries’, who are unregistered yet purchase social tickets from local people. These intermediaries may charge additional transportation costs, with an average cost of GEL 85 per m³ delivered.³⁴⁷ With extensive cutting by informal intermediaries, their identification, recording of revenues and payment of taxes is not possible under the social wood program’s system.³⁴⁸ Furthermore, given the degree of informality it is extremely difficult to track fuelwood harvesting, and ultimately differentiate between legally- and illegally-sourced fuelwood.³⁴⁹ The social tickets are highly subsidized, and do not reflect the true economic and environmental value of the natural resources harvested and sold. One study noted that the program “constitutes a substantial financial loss for forestry and the state”, specifically stating that the state loses at least GEL 30 million (over EUR 10 million) per year due to the program. This includes losses due to the low ticket price per m³ as it is a ‘silent subsidy/ social price’ that is economically inefficient and ecologically unsustainable. In addition, many of the trees marked for fuelwood could be sold for higher prices as industrial timber (i.e. often higher quality trees are used for fuelwood).³⁵⁰ It leads to even further losses when considering the loss of valuable ecosystem services.

Phasing out the social wood program

The [draft] New Forest Code stipulates that the social wood program will be phased out by January 1, 2022.³⁵¹ Under the new forest code, NFA will become the sole entity responsible for the provision of legally and sustainably sourced fuelwood from NFA managed forest lands. NFA is developing a new mechanism for the sustainable provision of fuelwood, overseen by NFA (see Activity 1.3).

³⁴⁶ Note: CENN defined the figure of around 200,000m³ per year for the optimal volume of extractable timber, however it is not clear how this was estimated. While there are clear data gaps that limit all estimations to speculative estimates, the authors of this study do not find this Figure to be unrealistic. Another study by Patarkalashvili (2016) using data from Gigauri (2000) estimated an annual increment of 4.6-4.8 million m³/year, which would imply an AAC of 3.7-3.8 million m³. While the CENN study is extremely low, the figures from Patarkalashvili seem high.

³⁴⁷ State Audit Office 2016a.

³⁴⁸ NFA 2019.

³⁴⁹ Ibid.

³⁵⁰ Garforth et al. 2016.

³⁵¹ Draft Forest Code – Version submitted to the Georgian Parliament in February 2019, Article 92, p. 56.

5.1.3.4.2 Forest concession system

Commercial harvesting is conducted by license holders, where owners of the license manage the forest by themselves, based on an approved management plan, within the limits of the license and management plan (Figure 53). Long-term wood harvesting licenses have been issued during the period of 2005-2011 for 5, 10- or 20-year periods.



Figure 53: Overview of commercial forestry licensing/ concession system³⁵²

Source: State Audit Office 2016b

The concession system contributes to the unsustainable management of forests for commercial harvesting. Under the past system, licenses were auctioned without an accompanying forest inventory, which has led to considerable uncertainties regarding the sustainability of concession management (in particular, related to unsuitable and unsustainable harvesting volumes). The State Audit Office notes that the forest management plans in the concessions set general objectives to forest maintenance and do not design specific measures for forest care, protection, and restoration.³⁵³

Main issues identified with the concession system are as follows:³⁵⁴

- Minimal benefits for the country
- Allocation of concessions and management of forest resources without an inventory
- Absence of concrete terms and conditions of licenses
- No concrete activities in FMPs
- Frequent changes in the law causing confusion, and incompliance with the law
- Insufficient forest supervision.

³⁵² Monitoring of licenses only started in 2013. Licenses were given without an inventory of the forests – so monitoring only began at a later stage.

³⁵³ For example, activities according to the plans do not identify the amount and species of trees, which should be restored, concretely which measures should be taken to care the forest, which methods should be used to protect the forest from fire and to maintain the biodiversity.

³⁵⁴ See State Audit Office 2016b for more detailed information.

The license system is controversially debated because there is evidence that harvesting practices and volumes are unsustainable, being characterized as '*forest exploitation*' rather than forest management. As of 2016, 46 special timber production licenses operated in Georgia. Monitoring by the Environmental Supervision Department only began in 2013 (after licenses were already allocated), showed that 44 out of 46 licensees were engaged in illegal logging and committed other violations (pollution of forest area, incorrect allocation of felling areas and frequency of disruptions).³⁵⁵

In 2012/13 the Government of Georgia decided that the license system will be phased out, as mentioned in the National Forest Concept. No new licenses have been issued since 2012, and the last remaining concessions are set to expire by the end of 2028. NFA is expected to take over the sustainable production of commercial timber, however a mechanism for the provision of fuelwood and commercial timber from sustainably managed NFA forests has yet to be operational.

5.1.3.4.3 Regulatory inconsistencies in forest regulations and the forest code

Various regulatory inconsistencies are present in Georgian forest regulations and within the country's forest code. This stems to a variety of policy changes since the drafting of the country's first forest code in 1999, and subsequent adjustments to the regulatory framework. This sub-chapter describes the evolution of Georgia's forest policy since 1999, and how it has led to substantial inconsistencies that are at the center focus of the country's current forest reform (see Chapter 5.2 for detailed information on the forest sector reform ongoing since 2013).

Forest policy in Georgia prior to 2013

In 1999, a basic law governing the forest sector – the Forest Code of Georgia - was adopted. The Forest Code of Georgia (1999) regulated legal relations regarding care, protection, restoration and use of Georgia's forest land and its resources.³⁵⁶

From 1999 to 2004 state forests were managed by the State Forestry Department and all appropriate documentation (logging licenses, agreement, tickets, export permissions, etc.) was issued by this body. Protected forests (protected areas) were managed by the State Department of Nature Reserves, Protected Areas and Game Farms. Logging remained the main form of forest use and was governed on the basis of 1-year licenses (or tickets).

The Law of Georgia on Licenses and Permits adopted by Georgian parliament in 2005 had important impacts on natural resources management, including protection and use of forest. Many of the regulations of the Forest Code, as well as of other laws, related to environment protection and use of natural resources were overridden and became irrelevant.

In 2007, a process was initiated aiming at maximum release of the State from forest management functions. Preparing this process of privatization, the Forest Department's structure changed and central office staff was reduced, its territorial bodies were reorganized into 10 regional forest management administrations.

The period from 2009 to 2012 was characterized by frequent and significant legal changes. About 200 statutory acts with relevance for the forest sector were passed by Georgian parliament and other government bodies with more than half of them being normative. Most of them lacked public participation and transparency. For instance, the 1999 Forest Code underwent 11 changes during these four

³⁵⁵ State Audit Office 2016b.

³⁵⁶ Within the code, the definition of State forest is explained, implying the lands and its resources (forests) legally assigned to the State.

years (see Appendix 5). Of particular importance, in this context, was the introduction of Law No. 4677 “On Changes to Georgian Forest Code” from May 2011, which introduces the concept of social cutting. As a consequence of the above-described developments, by 2012 the forest sector became over-regulated with many of the regulations made irrelevant, contradictory or even conflictive. During the years 2003-2012 several forest reform concepts were developed but none of them was finalized as a legal document. Altogether, the state of the regulatory framework for Georgian forestry in was described as “highly inadequate” for the application of sustainable forest management practices.

Inconsistencies and challenges with regulatory framework and their impact on forest management

As stated in the National Forest concept, current primary and secondary forest legislation does not correspond to the principles of sustainable management of forests resulting in conflicts and contradictions in regulatory documents.³⁵⁷

Another challenge is the full implementation of the regulatory framework, which is often limited due to budget and capacity limitations. For instance:

- In cases of mature stands with a low density (< 0.6), a harvest and systematic regeneration is mostly not planned as the open spaces are often covered with shrubs or evergreen undergrowth, blackberry and fern. In this case cuts shall not be planned unless a removal can be financed (Regulation 242).
- Regulations do not require the construction of resilient low-impact forest infrastructure, and investments are further limited due to the lack of capacities and funds.
- Maintenance cuts as tending and thinning allowing to improve stand quality, growth and species composition cannot be planned in degraded stands with densities < 0.7 due to restrictive regulation in the Regulation 241 on maintenance cuts. The option to assign them as necessary sanitary cuts is often not used (Regulation 241).
- Regulation 242 contains some, but not a comprehensive prescription for best practice reduced impact logging operations.
- Regulation 241 does not include a regulation concerning invasive tree species. Under SFM within the Georgian context the introduction of invasive tree species and genetically modified tree species should not be allowed.³⁵⁸
- No regulation in 241 or 242 regarding reference areas of natural forest types, which should represent the main natural forest types in the region. Such areas are important under SFM to enable the analysis of natural forest dynamics, and to learn from SFM management practices.³⁵⁹
- Under SFM, existing skidding lines and forest roads should have preference over the construction of new roads. However, there is no regulation stating this in Regulation 242.³⁶⁰ Regulations also do not contain detailed information to mitigate negative impacts from the construction of forest roads and skidding trails (e.g. runoff, erosion, and aesthetic impacts).
- For forested areas that do not represent natural forest types (forests with a majority of non-native species, or non-site-adapted species) shall be transferred to close-to-nature forests under SFM.

³⁵⁷ MoENRP and NFA 2014.

³⁵⁸ Draft Management Level Criteria and Indicators for Ecosystem-based Forest Management

³⁵⁹ Ibid.

³⁶⁰ Ibid.

However, under existing regulations 241 and 242 there is no clear guidance to support the identification and transformation of such areas.³⁶¹

5.2 Forest sector reform as a driver of change to combat forest degradation

5.2.1 Overview of process and status of reform

An extensive forest sector reform has been initiated in 2013 and is supposed to be finalized by 2020/21. The aims of the forest sector reform are (a) to change current approaches to forest use and management, (b) to develop a unified legal system of forest management and (c) to improve the institutional and technical capacities of forest management bodies. Key milestones of this ambitious reform process are described more in detail below.

5.2.1.1 The National Forest Concept³⁶²

In 2013, the Georgian Parliament approved the National Forest Concept. The goal of this concept is “to establish a system of sustainable forest management that will ensure the improvement of quantitative and qualitative characteristics of the Georgian forests, protection of biological diversity, effective use of the economic potential of forests taking into account their ecological values, public participation in forest management and fair distribution of derived benefits”³⁶³. The document stresses on the importance of forests for the sustainable development of the country. In more concrete terms, it emphasizes on (i) the necessity of the separation of management functions, supervisory functions as well as regulatory/policy and strategy development functions, (ii) the need for improving forest inventories to strengthen forest management planning and (iii) the need to help forests to adapt to climate change.

5.2.1.2 National Forest Program (NFP)

Building on the National Forest Concept, the Ministry of Environment and Natural Resources Protection of Georgia launched the National Forest Program (NFP) process in 2013 as an instrument to involve of stakeholders in the decision-making processes in order to support the Forestry Sector Reform. The aim of the program is to organize meetings to review thematic issues and to support elaboration of strategic documents, recommendations, draft law, regulations and other relevant policy documents. The Forest Policy Division has been coordinating the NFP process. Since 2013, more than 300 meetings have been held in the framework of the NFP process. Up to 270 stakeholders from different ministerial sectors, academia, the private sector, the NGO sector and several international development partners were involved in the NFP process.

The Forest Policy Division under the Department of Biodiversity and Forest Policy was appointed as responsible for the coordination of the process, which is supported by GIZ. The aim of launching the NFP process was to support the forest sector reform in Georgia and involve all stakeholders in the decision-making process. Within the framework of NFP, nine thematic groups of experts with various fields of knowledge were initially established. The thematic areas included: reforestation and forest

³⁶¹ Ibid.

³⁶² MoENRP & NFA 2014.

³⁶³ Ibid.

protection, economic assessment of forests, human resources development and forest education, legislation and institutional reform, forest monitoring and informational systems, national standards of sustainable forest management, establishing of biosphere reserve, adaptation of Georgian forests to climate change, and regional relations. These working groups are meeting frequently and have the common goal of providing recommendations to the key decision-makers. Among others, the stakeholders involved in the process of the NFP reached a common understanding of what is meant by sustainable forest management (SFM) under the specific Georgian circumstances. At the end of each year there is a plenary meeting to present the progress from the past year, and discuss plans for the upcoming year.

Based on the National Forest Concept a forest sector reform strategy and action plan has been elaborated, which has been approved by the government as part of the National Environmental Strategy and Action Plan 2017-2021 with the following goal: *“Improvement of the general condition and ecological functions of the forests, through the introduction of sustainable forest management system in Georgia”*.

Info Box 12: Evaluation of the National Forest Program

While the NFP process has been a suitable for communication, information sharing and stakeholder involvement in decision-making since 2013, it has turned into a less active process in later years as the frequency of the NFP Working Group meetings has decreased. In 2018, none the WG meetings took place. Among many causes for decreased activity of the NFP WGs were the voluntary nature of the arrangement, short-notice invitations to the meetings, and not keeping (digital) track of working documents (agenda, meeting notes, etc.).

An assessment report conducted by BFD, with support from GIZ, identified the need to establish the linkages between NEAP 3, National Forest Concept and the NFP process to “upgrade” the NFP process. To create ownership, employees of the FPD should moderate working groups (as well as representatives of other state forest organizations), as this will likely help intensify the involvement of other sectors in the WGs to mainstream cross-sectoral partnership. In addition, it was recommended to reduce the number of working groups to 7,³⁶⁴ and prepare 1-year working programs for each working group to ensure that each group has a structured focus (key deliverables, milestones, and clear thematic guidance).

The revitalization of the NFP process is timely as the draft Forest Code is undergoing Parliamentary hearings. Once the new Forest Code enters into force, it will generate important momentum to enhance and SFM at all levels in Georgia, promoting improved inter-sectoral cooperation on intersecting topics related to forests, energy, and rural development, among others.

In addition to the NFP process’s working groups and plenary meetings, government authorities have also discussed the potential to develop a high-level working group at the vice-minister level of key ministries (MoEPA, Ministry of Economy and Sustainable Development, Ministry of Finance, Ministry of Energy, Ministry of Regional Development and Infrastructure, among others), to accompany the NFP process, discussing cross-cutting topics, and encouraging the development of joint initiatives. This would be particularly relevant to discuss key topics such as alternative fuels, energy efficiency, rural development, phasing down fuelwood consumption, among other topics. However, until now, the high-level working group has not yet been established.

³⁶⁴ Seven working groups include: (1) Reforestation and Forest Protection, Alternative Energy Resources and Sustainable Use of Firewood, Forest Education and Research, Institutional Reform, Forest Informational Systems, Forests of Special Conservation Interests, and Forests and Climate Change.

5.2.1.3 The European Union Association Agreement (AA)

In June 2014, Georgia signed the European Union Association Agreement, which entered into force on July 1, 2016. The Agreement introduces a preferential trade regime known as the Deep and Comprehensive Free Trade Area (DCFTA). The Article 233 of the AA agreement acknowledges sustainable management of forests and trade in forest products.

Under the implementation framework, the work plan 2018-20 includes the following planned activities in the priority area of forestry³⁶⁵:

- Submission of Georgian Law “Forest Code” to the Parliament (under debate in Parliament)
- Development of final drafts on new by-laws of Forest Code: “Forest use procedures”, “Forest inventory and monitoring procedures”, and “Forest protection, maintenance and restoration procedures” (outstanding), and
- Strengthen the capacity of the Department of Environmental Supervision in order to ensure better control over illegal activities in the field of forestry (outstanding).

5.2.1.4 New (Draft) Forest Code

In September 2015, a coordinating committee for the development of a New Forest Code was established. Under the European Neighborhood and Partnership Instrument (ENPI) East Countries Second Forest Law Enforcement and Governance (FLEG II) Program and with the technical support of the World Bank, local experts have begun to develop the new "Forest Code" and the related sub-legislative acts. The process was undertaken in the framework of the National Forestry Program, with the maximum involvement of a wide range of stakeholders. The draft forest code is based on the above-described principles of the National Forest Concept approved by the Parliament in 2013, and envisages a number of innovations that will radically change the existing practices in the forestry sector. The new (draft) forest code introduces a number of new social, environmental and forest categorical principles (described in further detail in Chapter 5.3.2), which mainly seek to manage the forest in a more sustainable and comprehensive way. The new (draft) forest code also envisages the establishment of ecological networks of international significance (e.g. Emerald Network, Ramsar Sites, Important Bird Areas) for conservation purposes. In addition, the issue of illegal logging is being addressed in a much more comprehensive way aiming to improve transparency along the supply chain, strengthening anti-corruption safeguards, and addressing hotspots of illegality.

The draft forest code passed the committee hearings of the parliament and now awaits the final hearing in the Georgian parliament and is expected to be approved autumn 2019. Until then, the major regulatory document for the sector is still the 1999 Forest Code of Georgia, which is widely considered an inadequate legislative framework and one of the most significant barriers for the introduction of sustainable forest management.

The following paragraphs highlight some of the most relevant topics covered by the draft forest code. The new (draft) forest code promotes the principles of sustainable forest management by introducing the following novelties and clarifications for the context of Georgia.

- Introducing a new definition of forest: The new (draft) forest code uses a definition of forest in Georgia that is consistent with the FAO requirements, and with the requirements established by

³⁶⁵ http://trade.ec.europa.eu/doclib/docs/2019/april/tradoc_157858.pdf.

the UNFCCC process for CDM and REDD+ implementation and monitoring. In that context, “Forest – land plot with density of 0.1, width of not less than 10 meters and area of not less than 0.5 hectare covered with one or more forest timber species.”³⁶⁶

- Introducing a forest management system based on sustainable forest management principles: Management of forests considering ecological, social and economic functions (described in greater detail in Chapter 5.3.2).
- Establishing a system for forest functional categorization and setting up proper management regimes: Under the new (draft) forest code, forests are divided into four categories. According to the functions and main goals of the management, the forest areas are divided into protected forest, protective forest, resort and recreational forest and utilization and production forest. Management goal for:
 - Protected forest is the protection of biodiversity and rare and/or endangered species and vulnerable ecosystems.
 - Protective forest is to maintain and strengthen the protective functions of forests (regulating ecosystem services). Forest use in Water Protection Zones is carried out in compliance with the Law of Georgia on Water and Marine legislation of Georgia (Article 42)
 - Resort and recreation forest is to protect and improve recreational functions, landscapes and specific natural elements in forest.
 - Utilization (/production or commercial) forest is sustainable use of forest resources and preservation of protective functions of the forest.
- Establishing an improved institutional set-up with clearly distributed functions of forest policy, management and supervision functions, thus creating preconditions to use forest resources in rational, efficient and sustainable way. Separation of competencies is regulated in Chapter II of the new (draft) forest code, including the following:³⁶⁷
 - Regulator/Controller: Ministry of Environmental Protection and Agriculture (Forest Policy Division under the Department of Biodiversity and Forest Policy).³⁶⁸ The competences of the Ministry include definition of sectoral policy, drafting of legislative and legal acts, dividing of forest by functional purpose, organization of the forest inventory system including national forest inventory, approval of forest management plans for the state and the private forest, and supervising the state management body, etc.
 - Forest Supervision and Law Enforcement: Ministry of Environmental Protection and Agriculture (Department of Environmental Supervision)³⁶⁹

³⁶⁶ Draft Forest Code as of February 2019.

³⁶⁷ Here we list the authorities most relevant for the implementation of the project. More information on other Authorities (e.g. Tbilisi City Hall), refer to Chapter II of the new (draft) forest code.

³⁶⁸ Competence of the Ministry (Chapter II, Article 18 of the new [draft] forest code – version submitted to Parliament in February 2019).

³⁶⁹ Competence of Supervision Authority (Chapter II, Article 21 of the new [draft] forest code – version submitted to Parliament in February 2019); State control in Georgian forests over complying with the legal requirements is exercised by the Environmental Supervision Department, as an entity subordinated to the Ministry. DES controls state forest territories including Autonomous Republic of Adjara. In protected areas, APA is responsible for the state control, in addition to DES. Article 97 on Necessary Measures for enacting this Code states that legal and organizational arrangements of the body responsible for the state control in the field of forest protection shall be ensured before January 2, 2020.

- Forest management of state-controlled forest areas: National Forest Agency. Except for the forests located within protected areas and within territories of the autonomous republics, management of state-owned forests is undertaken by the state forest managing body – a legal entity of public law.³⁷⁰
- Strengthening of forest information, planning and management system: The (new) draft forest code provides the legal basis for the implementation of various measures aimed to improve forest planning, management and monitoring. This includes, for instance, the National Forest Inventory, and the establishment of a comprehensive forest information and monitoring system (FIMS) for effective governance of forest resources. Chapter III of the draft Forest Code introduces ‘Forest Inventory [Forest Record Keeping] and Planning’. The system of record keeping, inventory and planning consists of:
 - Forest Record Keeping System of Georgia (Article 23): Consisting of the National Forest Inventory of Georgia, Forest Planning and Information and Monitoring System.³⁷¹
 - National Forest Inventory of Georgia – NFI (Article 24): The NFI is carried out by the Ministry once every 10 years. It is regulated by the decree on the Rule of Georgia’s Forest Inventory System and Monitoring.
 - Forest planning (Article 25). Forest Management Plans have to be developed for 10 year periods by the Forest Management Bodies for their territories. Forest Management Plans are approved by the Ministry, except for Autonomous Republics, where the relevant authorized bodies approve the plans.
 - Forest information and monitoring system of Georgia (Article 26): Forest information and monitoring system of Georgia pools and systematizes documents containing information on the forest of Georgia, its protection, reforestation/afforestation and forest use
 - Forest monitoring (Article 27): The goal of forest monitoring is to reflect the ecological state of Georgia’s forest, to submit the results of analysis to the state entities for the purpose of improving that ecological state and to inform the population of Georgia. Forest monitoring is undertaken by forest management bodies on their action areas, by their territorial divisions and by other entities and forest users defined according to Georgian legislation.
 - Special study of forest (Article 28): Special study of forest is carried out for: developing a reforestation/afforestation project for specific forest area, as well as determining pathological condition of forest and quantitative and qualitative characteristics of forest resources; and/or for ensuring effectiveness of forest resources management and for timely implementation of forest use activities. The results should be presented in an annual action plan
 - Annual Action Plan (Article 29): Annual Action Plan is elaborated based on the Forest Management Plan, Forest Use Plan and/or outcomes of special study of forest, and provides detailed description of the activities planned for a year. Prior to the approval of the Annual

³⁷⁰ Competence of Forest Management Body (Chapter II, Article 20 of the new [draft] forest code – version submitted to Parliament in February 2019); The competences of the Forest Management Bodies include “forest inventory and taxation as well as elaboration of forest management plans, all forest management related activities including the use and marketing of forest resources, provision of information for a database (Forest Register) for monitoring purposes, inform the respective bodies about illegal forest use. The sources of funding of the future State Forest Management body will include state budget, credits, targeted grants and donations, fees for services, compensation fees and new income from commercial activities.”

³⁷¹ This Article further notes the “*Regulation on Forest Recordkeeping System and Monitoring Rules of Georgia shall be developed and submitted to the Government for approval by the Ministry.*”

Action Plan, forest user is not allowed to use forest for the purposes of economic activities, except for cases provided by paragraph 1 of article 67.

- Transitioning to a new system of fuelwood and timber provision by NFA. The new (draft) forest code foresees the following arrangements for the provision of sustainably produced fuelwood and timber.³⁷²
 - Wood-related commercial activities exclusively implemented by Forest Management Bodies. Forest Management Bodies will be responsible for the production and sale of fuelwood and commercial timber, as well as the commercialization of non-timber forest resources.
 - Phasing out of the social wood programme. The programme will be phased out by January 1, 2022 according to the Article 92 of the new (draft) forest code.
 - Phasing out of logging concessions. New concessions will no longer be issued (and have not been issued since 2012), existing ones are allowed until the expiry date is reached.
- Establishment of mandatory qualifications for foresters and forest workers.³⁷³ Forest management bodies must “ensure the mandatory participation of persons having the qualification of forester and forest worker in forest management”. This means that all staff working in positions of a forester and forest worker must hold an official qualification (Article 86):
 - A person may be a forester if he/she holds a respective university degree in the field of forestry (at least a bachelor’s degree)
 - A person may be a forest worker if he/she has a relevant professional qualification.

Private enterprises that provide the timber harvesting/logging and transportation services to the NFA are also required to provide qualified staff for the outsourced work. Understanding that many existing forest sector employees in both the public and private sector may not hold such formal qualifications, the new (draft) further code notes that current employees will have until the end of 2025 to obtain their formal qualifications. If they are unable to do so by the end of 2025, it will result in the “prohibition of their professional activity on the grounds of non-compliance”. It is not clear how NFA and MoEPA will streamline qualification processes.³⁷⁴

5.2.2 Sustainable Forest Management (SFM) approach in Georgia

In the existing forest code (i.e. ‘old’ forest code), SFM is discussed in the context of the declaration on principles of sustainable development of forests and principles within Georgia’s Law on Environmental Protection. The new forest code places sustainable forest management at its core, and it is a cross-cutting element throughout the entire code.

The Preamble of the New (draft) Forest Code recognizes the role of forests as of special value for Georgia, stating that “Georgia’s forests shall be managed based on the system established in accordance with the principles of sustainable development, which will provide improvement of quantitative

³⁷² Article 38 of the new (draft) forest code states “Special use of state forest for timber logging, collection of non-timber forest products, woody plant products and secondary wood material is carried out exclusively by the forest management body based on the goals of sustainable forest management within the authority under this code and in accordance with forest management plan and/or annual action plan.”

³⁷³ Vocational education and training programs and colleges refer to forest workers as “forest work specialists”, to make the profession sound more appealing. It refers to the same profession as forest workers – the official term used in the forest code.

³⁷⁴ Currently vocational education programs for forest workers take between 9-11 months.

and qualitative parameters of Georgia's forests, protection of biodiversity, rational use of forest's economic potential taking into consideration its ecological value, public involvement in forest management and access to forest resources.”³⁷⁵ SFM is further defined as the “management and use of forests and forest lands in such a way and rate that maintains its biodiversity, productivity, regeneration capacity, vitality and their potential so that at present and in the future relevant ecological, economic and social functions will be fulfilled on local, national and global levels and that does not cause damage to other ecosystems.”³⁷⁶

SFM in the Georgian context must take into account the following principles:³⁷⁷

- “Methods used in the process of forest management must provide for the preservation and improvement of its biodiversity, productivity, self-regeneration and viability;
- Forest function shall be considered in forest management planning processes so that receiving one type of benefit from the forest does not cause the degradation of other forest functions/ ecosystem services;
- Integration of the local population's interests into forest management decision-making shall be based on the principle of SFM. Everyone's access to forest for its general use shall be ensured;
- In case forests are used for non-forestry purposes for the state of public interests, adequate compensation measures defined under Georgian legislation shall be provided, apart from the exceptions set out by the Forest Code”.

Info Box 13: Climate benefits of SFM

The sustainable management of forests enables the long-term provision of vital services. Forest ecosystems provide diverse ecosystem services, ranging from supporting services (e.g. nutrient and water cycling), provisioning services (e.g. fuel, fiber, food), regulating services (climate regulation, natural hazards), and cultural services (e.g. spiritual, recreational use).

Related to climate benefits, SFM supports both climate change mitigation and adaptation. SFM enables carbon sequestration through forest restoration, reforestation, and enhancement of carbon stocks through management practices, as well as reducing deforestation and forest degradation. SFM further strengthens the adaptive capacity of forests and trees through the adoption of sustainable management practices that promote healthy, and diverse ecosystems, as well as adaptive

³⁷⁵ New [draft] Forest Code, Page 1

³⁷⁶ Version of New (Draft) Forest Code submitted to the Georgian Parliament in February 2019, page 9.

³⁷⁷ New [draft] Forest Code Article 4, p. 12,

management practices. The implementation of suitable forest adaptation strategies can further strengthen the adaptive capacity of forest-dependent communities.

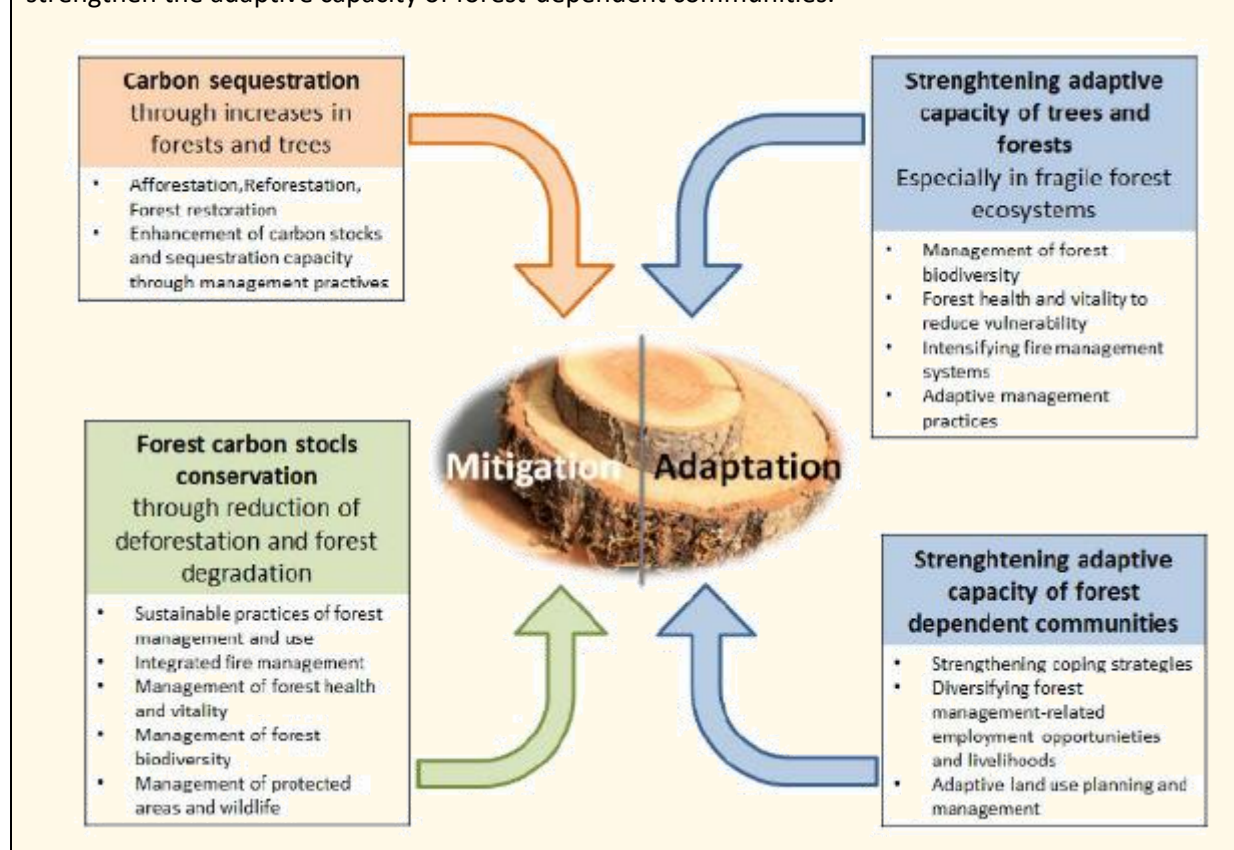


Figure 54: Impact of SFM on climate change adaptation and mitigation

Source: GIZ 2014

To support the country's ongoing forest reform, two sets of criteria and indicators (C&I) have been elaborated to guide regulatory reforms and inform the operationalization of SFM in the country:

- (Draft) National Principles, Criteria and Indicators for SFM
- (Draft) Management-level criteria and indicators for ecosystem-based forest management.

5.2.2.1 National Principles, criteria and indicators (C&I) for Sustainable Forest Management

Sustainable Forest Management in the context of Georgia aims to achieve the balance between society's increasing demand for forest products (fuel) and benefits, and the preservation of forest health, diversity, mitigation potential and other ecosystem services.³⁷⁸

The National Forest Concept for Georgia (2013) defined as one of its main principles the Principle of Sustainable Forest Management (SFM). This made the way free for the adoption of international agreements from the International Earth Summit in Rio (1992) and later the Criteria and Indicators for Sustainable Forest Management of the European Union and the ongoing Forest Europe Process to the Forest Sector of Georgia.

The draft Forest Code, Art. 2 (version February 2019 transmitted to Parliament for approval) gives the latest definition of SFM for Georgia: Sustainable forest management - Management and use of forests

³⁷⁸ GIZ 2014.

and forest lands in such a way and rate that maintains its biodiversity, productivity, regeneration capacity, vitality and their potential so that at present and in the future relevant ecological, economic and social functions will be fulfilled on local, national and global levels and that does not cause damage to other ecosystems.

1. Ecological Principle

Under the ecological principle, the details concerning ecosystem-based forest management are described. The general idea behind the ecological principle is the consideration of biodiversity conservation not only in protected areas (segregation approach) but also in the management of all forest categories (inclusive approach).

2. Economic Principle

The economic principle concerns e.g. the promotion of processing forest products to gain benefits inside of Georgia, clarification of framework conditions concerning payment for ecosystem services provided by forests, and recognition of the contribution of the forest sector to Georgia's GDP.

3. Social Principle

The social principle concerns e.g. the provision of income opportunities in the forest sector, safe and healthy working conditions, access to forest based natural resources.

4. Multifunctional Principle

Any decision shall be respectful of all forest functions so that receipt of one type of benefit from the forest does not cause degradation of its other functions.

5. Transparency Principle

All concerned stakeholders – especially the forest depended rural population – shall be informed about and involved into any political, strategic and legal reforms.

These five principles of SFM described above provide the frame for political and strategic as well as management decisions in the forest sector. The ecological, economic and social principles are further specified by more detailed criteria and indicators. The (draft) National Principles, Criteria and Indicators for Sustainable Forest Management document has supported the shift towards SFM, informing the elaboration of the New (draft) Forest Code – all of which feed into the NFP process. The National Principles, Criteria and Indicators for SFM shall further inform the revision of relevant secondary legal acts once the new forest code is approved.

Under the first principle (Ecological Principle) more detailed criteria and indicators have been elaborated for the management level to clarify the understanding of Ecosystem-based forest management.

5.2.2.2 Management-level criteria and indicators for ecosystem-based forest management

The main three aspects of Ecosystem-based Forest Management are:

- Close to nature: Forests shall be managed as close as possible to the conditions of Natural Forests.
- Sufficiency: The use shall not exceed the Natural Capacity of the forest.
- Precaution: Out of all management measures only those shall be applied with Minimum Negative Impact to the forest and its environment.

These aspects are general guidelines for planning and implementing silvicultural measures in nearly all situations of Ecosystem-based Forest Management. It is a concept which aims at mostly adapting to natural processes in the forests.

Ecosystem-based Forest Management regards managed forests in the long run as permanent forests. These do not differ anymore in age classes, tree species or man-made structures, but in different “forest types” which are near-natural forest associations, specified by different quality and occurrence of soil, climate, exposition and altitude.

Ecosystem-based Forest Management is aware of nature as a self-containing factor of production, which has permanently optimized its productivity through adaptation over millions of years. Natural forest associations are visible configurations of such ongoing processes. The closer structures, processes and functions of managed forests come to natural forests the higher their productivity and economic outcome. The permanent adaptation to changes in the environment by the natural forest by is the reason for low natural risks. Even ecosystem services of different sorts like clean water and air, high biodiversity and recreation value are abundantly characteristic of forests under ecosystem-based management.

Ecological integrity is the precondition for good social services and high economic productivity of a managed forest. That is why Ecosystem-based Forest Management is at present the most advanced concept for good forestry worldwide, as recommended even scientifically by the International Union of Forest Research Organizations (IUFRO) at its World Forest Congress in 2010 and elaborated by the ongoing Forest Europe Process based on several ecological criteria and indicators.

To understand and follow the idea of ecosystem-based forest management a set of detailed management level Criteria and Indicators has been elaborated by Georgian forest experts, which are briefly presented in the following Table. The (draft) management-level criteria and indicators for SFM are closely linked with key regulations 241 and 242, and aim to guide revisions to the regulatory framework once the new forest code is approved, ensuring alignment with the country’s interpretation of ecosystem-based forest management for the Georgian context. Ecosystem-based Forest Management is definitely a fundamental part of Sustainable Forest Management. But it has to be interlinked with social, economic, cultural, political and other aspects of people and their country. High demands for firewood and timber, grazing area for livestock in the forests and over-exploitation of many forests in the past are some of such specific aspects, which have to be considered during the planning of management activities especially in degraded forest areas and might require compromising ecosystem-based forest management regulations.

*Table 36. Overview of criterion and indicators from the draft Management-level Criteria and Indicators for Ecosystem-based forest management**

Criterion	Indicator (thematic topics for indicator formulation)
1. Regeneration and restoration activities ensure a close-to-nature forest development (succession)	1.1 At least 80% of the regeneration in a forest area is based on natural regeneration 1.2 If the regeneration and restoration of forest stands require planting or sowing of trees, only native and site-adaptive tree species shall be used 1.3 The introduction of invasive tree species and genetically modified tree species is not allowed
2. Cutting operations (maintenance fellings, and final cuts) promote the development of natural forests types with high quality timber and without weakening the natural potential of the forests	2.1 Maintenance fellings/ cuttings are concentrated on diseased, bad shaped, less valuable and non-native species 2.2 Early maintenance operations are implemented only, if non-native or not site-adapted tree species cover more than 50% of the area of the number of trees 2.3 Maintenance cuttings in dense even-aged forest stands originating from natural regeneration shall only start after self-differentiation is completed normally at the age of 30-40 years 2.4 Minimum time period between maintenance operations is 20 years 2.5 During final cutting operations only those trees, which have reached an agreed target diameter or target age are removed 2.6 Only selective maintenance and final cutting operations are allowed, which open the canopy not more than 0.3 ha 2.7 Maintenance and final cutting operations reduce the standing volume in the cutting area not below 70% of the timber stock of a comparable natural forest type 2.8 Each cutting operation does not remove more than 20% of the standing volume in the cutting area 2.9 Cuttings shall be organized in a way ensuring minimum damages to the remaining forest stand OR [Alternative] Felling and skidding damages to remaining trees does not exceed 5% of the number of remaining trees in the cutting area with a diameter of 20 cm (d 1.3m) and above
3. Essential ecological structures of natural forest, like habitat trees and dead trees, must be preserved in managed forests	3.1 At least 5% of the standing volume shall always be kept as habitat trees 3.2 At least 5% of the standing volume shall always be kept as standing or lying dead wood
4. Unmanaged reference areas shall allow the analysis of natural dynamics in forests, and to learn from these for better ecosystem-based management practices	4.1 Reference areas shall represent the main natural forest types in the region, characterizing the given forest 4.2 Reference area of a natural forest type should not be smaller than 100 ha

Criterion	Indicator (thematic topics for indicator formulation)
5. Forests, which do not represent Natural Forest Types (forest with a majority of non-native and/or non-site-adapted tree species) shall be transferred to close-to-nature forests	<p>5.1 The area or the timber stock of the introduced species is reduced stepwise to only 20% or less</p> <p>5.2 Only selective cutting with opening of the canopy not larger than 0.3 ha</p> <p>5.3 In the same area, cutting operations can be repeated not earlier than 10 years</p> <p>5.4 Each cutting removes up to 20% of the trees or timber volume</p> <p>5.5 The timeframe for transition does not exceed 50 years as a maximum</p>
6. Forest infrastructure like forest roads and skidding trails shall be planned and implemented under the aspect of minimum disturbance	<p>6.1 Existing skidding lines and forest roads have preference to be used before new ones are constructed</p> <p>6.2 Harvesting operations in forests shall not disturb, remove or destroy more than 10% of the area for the purpose of skidding trails, forest roads, and other infrastructure</p> <p>6.3 Preference is given to the transport techniques which prevent vegetation and soil from damage (e.g. cable techniques)</p> <p>6.4 Apart from these transport lines the forest soil is not disturbed, removed or destroyed in its ecological functions by transport activities</p> <p>6.5 Negative influence on the landscape as a result of the construction of forest roads and skidding trails, like quick water runoff, erosion and negative aesthetic appearance in nature are avoided</p> <p>6.6 Skidding trails are rehabilitated against erosion and water runoff immediately after the cutting operation in that area is finished.</p>
7. Prohibited are those measures, which may violate the ecological integrity of forests (see Forest Code, Chapter XVI Forest Protection)	<p>7.1 Clear cuts (opening of more than 0.3 ha each)</p> <p>7.2 Establishment (planting or sowing) of monocultures</p> <p>7.3 Application of pesticides or fertilizers</p> <p>7.4 Removal of humus layer</p> <p>7.5 Burning of biomass inside of forest stand</p> <p>7.6 Pollution of soil and water with engine oil, petrol, waste and/or poisonous substances</p> <p>7.7 Activities which might disturb the flora and fauna during sensitive times (e.g. flourishing, mating and breeding periods).</p> <p>7.8 Cutting of endangered species (except in special cases)</p> <p>7.9 Exceptions out of a good reason can be made for the indicators described under criterion 7 in the case of special permit from the responsible authority</p>

*Provides only select information from the Management-level C&I for ecosystem-based management. Refer to the draft document for additional footnotes, as well as additional legal text and/or comments related to regulations 241 and 242.

Source: Government of Georgia, 2018 – Draft Management-level Criteria and Indicators for Ecosystem-based forest management (Version from May 2018)

5.2.3 Changes the reform will bring to the forest sector

5.2.3.1 Policy

The new Forest Code foresees a wide application of the above described principles, criteria and indicators at all levels in Georgia. With its approval anticipated in 2019, there are various legal documents and regulations that will need to be revised and/or elaborated to enable SFM. The revised legal regulations will facilitate the adoption of SMF, addressing the existing gaps and harmonizing regulations. Many of the existing regulations have been amended frequently leading to gaps in forest legislation and practice.

Key existing regulations for SFM – Regulations 179, 241 and 242

Of particular reference for sustainable forest management is the revision of Regulations 179, 241 and 242.³⁷⁹ As mentioned in Chapter 5.1.3, these regulations have gaps in regard to SFM implementation (e.g. in inventory planning and implementation, zoning, and forest maintenance measures). The Management-level Criteria and Indicators for Ecosystem-based Forest Management, will support the revision of these regulations.³⁸⁰ GIZ has already committed to support the Government of Georgia with the revision of Regulations 179, 241 and 242 as soon as the new forest code is approved.³⁸¹

Additional (new) regulations

In addition to revising the three main secondary legal acts listed above (on forest management, inventory and utilization), it will also be necessary to elaborate regulations on the commercial use of non-timber-forest resources.³⁸² Under current regulations, collection of non-timber forest resources is only permitted for personal use, whereas the commercial use of non-timber forest resources is only partially regulated (for certain non-timber forest resources, e.g. snowdrop bulbs).³⁸³

The new forest code stating that the use of non-timber forest resources for commercial use will be under the management of the respective forest management body (Article 95 of the new [draft] forest code).³⁸⁴ Chapter 7 of the Forest Code “Collection of Non-timber Forest Resources, Woody Plant Products and Secondary Wood Material” provides detailed information on the foreseen use and management of non-timber forest resources, including for commercial purposes. The Forest Code further describes that non-timber forest resource use, as well as woody

³⁷⁹ Prior to starting the revision of the legal framework, existing assessments of regulatory changes will be revised to account for any changes in the forest code, since the code is currently only in draft form. While the forest code is likely to be approved in mid-to-late 2019, prior to project start, this activity will ensure that legal revisions are based on the *approved* forest code.

³⁸⁰ In addition, a detailed assessment of these gaps and needed revisions (incl. other regulations and legal sub-acts) is provided in Appendix 2.

³⁸¹ It is expected that majority of the revisions will be made prior to project start, assuming the forest code is approved in 2019. However, there may need to be additional revisions in the future as the forest code is implemented, to improve and refine the regulations to facilitate an efficient and effective implementation of the forest code.

³⁸² While the elaboration of a secondary legal act on the commercial use of non-timber forest resources has been foreseen for several years (e.g. it is mentioned within the National Biodiversity Strategy and Action Plan 2014-2020), it has not yet been elaborated. This is primarily due to the ongoing process of drafting a new forest code, for which the regulation will need to be aligned.

³⁸³ From the existing Forest Code (1999) discusses licenses for “exporting pine cones and the license for using snowdrop bulbs and/or cyclamen tubers included in the attachments of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), “

³⁸⁴ Note: currently, commercial use of NTFPs are not regulated.

plant products and secondary wood material must be based on FMPs and/or annual action plans.

Once the new forest code is approved a regulation on the commercial use of non-timber forest resources should be drafted. The regulation will cover key topics, including (but not limited to): types of non-timber forest resources that can be commercially harvested, methodology how to estimate the amounts for each NTFP that can be commercially harvested to ensure sustainable management of the resources, fees for commercial harvesting, processes for commercial harvesting (applications, forms, monitoring, etc.), timing and zones for harvesting. The regulation should provide operational guidance to ensure the sustainable management and monitoring of non-timber forest resources – in line with the new forest code.

Info Box 14: NTFP regulations and opportunities

Under current regulations, collection of non-timber forest products (NTFP) is only permitted for personal use, whereas the commercial use of non-timber forest resources is only partially regulated (for certain non-timber forest resources, e.g. snowdrop bulbs.³⁸⁵ For high-value timber products, such as snowdrop bulbs, cyclamen tubers, and cones of Sochi, these value chains are already advanced with limited potential to catalyze additional private sector investment, especially considering the existing licensing system, and need to ensure these resources remain sustainably managed (under the Convention on International Trade in Endangered Species of Wild Fauna and Flora, CITES).

Where there is potential for non-timber forest resource development is related to small-scale community-based NTFP management in coordination with NFA, and based on up-to-date FMPs. Nonetheless, there is limited potential to leverage substantial private sector investment in other NTFPs as the markets are often small volume, with substantial fluctuations (e.g. seasonality, regional variations). It is recommended the project mobilizes additional co-finance to support investments in NTFP value chain assessments, and community support to sustainably manage NTFPs (ensuring alignment with forthcoming regulations on the commercial use of NTFPs).

Communication of regulatory changes and forest sector reform

- Under the new forest code, MoEPA and the Ministry of Education, Science, Culture and Sport shall “ensure informing the population on the significance of forests and their resources”.³⁸⁶ MoEPA is already in the process of developing a communication strategy for the new forest code and forest sector reforms that will be ready by the end of 2019. This strategy aims to promote cross-sectoral awareness raising on the new forest code, changes in the regulatory framework, and the overall significance of forests and the many services that they provide. It includes a strategy for informing key actors not only within the government (both vertical and horizontal dissemination of information), but also to diverse stakeholders including CSOs, private sector actors, and local communities.

³⁸⁵ From the existing Forest Code (1999) discusses licenses for “exporting pine cones and the license for using snowdrop bulbs and/or cyclamen tubers included in the attachments of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)”

³⁸⁶ Draft Forest Code (Version Submitted to Georgian Parliament in February 2019), Article 16, p. 18.

Barriers for establishing an enabling policy and regulatory environment for SFM

The following points outline the main barriers associated with awareness raising related to the new forest code, and forest sector reform:

- **Balancing the need for timely revisions and expert inputs with available budgets:** As soon as the forest code is approved, the timely revision of numerous secondary legal acts/ regulations will need to be initiated (at least 24 regulations are expected to be revised). While support has been committed to support most of these revisions prior to project start, it is expected that additional revisions may be needed in the coming years to refine the regulatory framework, building on experiences and lessons learned.
- **Limited awareness:** Awareness raising for diverse stakeholders on the forest sector reform and regulatory changes will be necessary once the forest code is adopted. While the government is developing a communication strategy and action plan, the implementation of the plan requires additional support. EIEC will have an important role in supporting the implementation of this action plan. However, as noted in the Capacity Needs Assessment, EIEC has limited capacities and financial resources.
- **Limited inter-sectoral coordination and cooperation:** The new forest code and reforms are generating substantial momentum in the country to transform the forest sector and promote sustainability to meet not only the country's climate targets, but also targets related to sustainable development in general. **Many topics in the forest sector are inter-linked with other key sectors, however until now cross-sectoral cooperation and coordination is relatively limited.** The NFP process, including its multi-stakeholder working groups and annual plenary meetings - as discussed in Chapter 5.2.1, is envisioned as one element to support multi-stakeholder awareness raising and cooperation for forest sector reforms. While it has brought diverse stakeholders together, interest in the platform has declined. Nonetheless, a recent assessment made several suggestions to reactivate and upgrade the process (Chapter 5.2.1). It has been further suggested during the project development process to integrate a high-level inter-ministerial working group into the NFS process, to encourage joint initiatives and efforts.

5.2.3.2 Forest Supervision

As evident in Chapter 5.1, the illegal use of forest resources as one of the principle challenges facing the country, where an average of 75% of wood removals are illegal (see Chapter 5.1.2). The explanatory note accompanying the new (draft) forest code makes the necessary statement that the *“Improper or illegal use of forest timber resources puts sustainable forestry under a serious risk.”*³⁸⁷

The Georgian government recognizes this challenge and the need to improve forest supervision. Under the sector reform, the responsibility for the physical protection of forest begun transitioning from NFA to DES in 2019 (ongoing). Thus, DES is now responsible for overseeing the

³⁸⁷ New (draft) Forest Code, version submitted to Parliament in February 2019, p.72.

compliance of forest use with legal requirements, with the exception of forests under the management of Tbilisi municipality, and forests in Autonomous Republics.³⁸⁸ It is expected that this transition will help improve transparency and create additional checks and balances.

The measures presented in the following Table have been initiated by the Government to reduce illegal forest utilization due to inadequate forest supervision, addressing barriers identified in Chapter 5.1.3.³⁸⁹ Remaining financial and capacity barriers faced by DES are described in Chapter 5.2.4 in greater detail.

³⁸⁸ Ibid., Article 21, p. 22.

³⁸⁹ DES presentation 2018 (unpublished).

Table 37: Overview of barriers, proposed measures and status

Barrier (see Chapter 5.1.3)	Proposed Measure within Forest Sector Reform	Status
Insufficient monitoring and incomplete control over timber value chains	The introduction of an electronic system of timber resource management: <ul style="list-style-type: none"> The ‘<i>Electronic System of Timber Resource Management</i>’ is a FIMS, module that enables DES to track timber, improve supervision of forest value chains from the forest until primary processing. While it has been operational for some time, it needs updating to address gaps between the Electronic System of Timber Resource Management and the Revenue Service Software.³⁹⁰ 	Ongoing: Additional technical and financial support necessary to align the ESTR with the Revenue Service Software):
Limited financial resources, staff, equipment and capacities of forest supervision	<ul style="list-style-type: none"> Transfer forest supervision responsibilities from NFA to DES (ongoing)) Increase forest patrol and inspector staff (hire at least an additional 459 staff from 2018 levels for forest supervision) Introduce technology and equipment that improve the efficiency and effectiveness of forest supervision (e.g. Tablets for FIMS, however budgets limit the number of Tablets available, some piloting of cameras) 	Ongoing: Insufficient finance and insufficient capacities to successfully overcome this barrier: Need for outside support; see Chapter 5.2.4 for more detailed information on financial and capacity barriers of the main institutions)
Inefficiency of sanctions:	Tightening responsibility concerning law violation and sanction inefficiency: <ul style="list-style-type: none"> The liability law has been drafted and the elaboration of key secondary legal acts are expected in 2020, with support from the EU. Secondary legal acts to be elaborated include: resolution on “technical regulations on compensation of environmental damage”, “technical regulations on the rules of criteria for determining corrective measures for a person responsible for damaging the environment and rules for drawing up a plan of corrective actions”, “resolution on “financial guarantees of environmental liability”, among others.³⁹¹ 	Ongoing: Support to the liability law is currently provided by the EU Project: “Support to implementation of the Environmental provisions of the EU-Georgia Association Agreement”
Existence of unregistered sawmills	Tightening requirements and improving supervision of sawmills (): <ul style="list-style-type: none"> Strengthened compulsory environmental requirements and regulations for sawmills, including the installation of cameras in sawmills and access to DES for regular monitoring and inspections. This is expected to reduce the use of illegal commercial timber. 	Ongoing: DES targeted measures to be completed by the end of 2019. Need for further investments in developing the Electronic System of Timber Resource Management to improve legality within value chains (esp. at the

³⁹⁰ Tracking for DES stops at sawmills, and it is challenging for DES to continue tracking after timber is processed and then integrated into the Revenue Service Software.

³⁹¹ Insight from EU Project “Support to implementation of the Environmental provisions of the EU-Georgia Association Agreement”.

Barrier (see Chapter 5.1.3)	Proposed Measure within Forest Sector Reform	Status
		sawmill level), as the current system is not yet aligned with the Revenue Service's System (see Sub-Chapter 5.2.3.4 on FIMS)

Additional recommendations for DES to address barriers to forest supervision:

Acknowledging that DES has major financial and capacity limitations, the following investments are recommended, in addition to the measures identified in the previous table, to strengthen forest supervision. However, the implementation of these measures will require external financial and technical support as government budgets are insufficient.

- **Development of consistent standards, standard operating procedures for staff:** DES requires additional technical support to harmonize new standards and systems for the forest patrolling division with the standards and procedures of the already existing environmental patrolling division, and ensuring procedures and protocols are harmonized with the new forest code and liability law (and associated secondary legal acts). Without additional support, incoherent SOPs lead to differentiated interpretation of the law, and an inconsistent and ineffective application of law enforcement and suitable forest supervision practices. This is particularly critical due to the growing number of staff within DES.
- **Development of training modules on best practices for forest inspection and forest patrolling, and training trainers within DES:** Capacity building is needed for staff on SOPs and newly revised regulations (see above), best practices for patrolling and forest inspection, SFM for forest inspections and assessment of damages (under the new liability law), and FIMS. Trainings should not be limited to 'one-off' trainings by external trainers, as they often are, but DES's trainers should be trained on training modules (i.e. training trainers).
- **Development of a knowledge management and training platform:** Beyond the need for developing training modules and implementing trainings, DES would benefit from a centralized knowledge management and training platform. Currently trainings are often limited to one-off trainings, with limited sustainability. A standardized training system is needed to ensure consistent training (in terms of topics and quality of trainings), to strengthen staff capacities. It was noted that e-learning elements will be particularly useful, especially for disseminating information on SOPs, protocols, etc., combined with in-classroom and field trainings, to improve knowledge retention, organizational learning, and dissemination within the institution. The capacities of DES's training pool (i.e. trained trainers within DES responsible for training other staff) should be further strengthened to enable improved knowledge dissemination and capacity building within DES in the long-term (institutionalization of trainings).
- **Investments in suitable equipment to improve the efficiency and effectiveness of forest supervision:** DES requires investments in equipment that can improve the efficiency and effectiveness of forest supervision. This includes: off-road vehicles for mountainous areas, motorbikes, drones, video-audio devices, cameras, camera traps, and computers, among others. Such equipment is considered highly relevant and important for improving forest supervision in the country. High-tech equipment such as drones and cameras reduce the need for additional staff to cover large parts of remote forests areas with supervision services (see Table below). It therefore increases the efficiency of DES operations. However, current budgetary constraints limit the up-front investments in such technology (see Chapter 5.2.4 for more detailed information on available budgets).

Table 38: High-tech and innovative equipment needs of DES

Equipment	How will this improve forest supervision?
Portable radio station, car radio station	Ensures communication with DES staff during working in time in forest districts without or with a weak mobile signal
All-terrain off-road vehicles (Bagi) and offroad 4x4 jeeps for driving in mountainous/ forest areas.	Ensures movement in forest land (on high mountainous forest slopes) to improve response to detected offences. Currently DES has very few suitable vehicles that are able to reach these areas, greatly limiting the reach of forest supervision in these areas.
Camera traps, with automated transmission via GSM camera traps that are compatible with GSM operators in Georgia	Early experiences piloting/ implementing camera traps have shown their effectiveness when positioned in strategic areas to detect poachers, illegal loggers and other law violations. It further supports controlling access to forest roads and ultimately timber tracking.
Drones	For rapid response to detect illegal activities and to strengthen monitoring and control over forest resources. ³⁹²
Tablets with software downloaded (linked to FIMS Activity 1.5)	Software will be installed into the tablets that will support forest supervision. Software will provide information on where forest compartments are located, information on access roads to forests, information on FMPs, annual plans, activity recording, regulations for ensuring control, reporting and data collection on forest supervision (linked with FIMS), information on identifying illegally logged timber (incl. information on means for determining species and volume – including a photo feature), among other features.
Cameras (for some regions)	Some regions have also requested additional cameras so that they are able to document illegal activities, and environmental damage.
GPS equipment for logging trucks	For installation in registered logging trucks, to enable real-time tracking of logging trucks to improve timber tracking and establish clear chains of custody (only registered and traceable logging trucks permitted).

5.2.3.3 Forest Information and Monitoring System

As described in Chapter 5.1.3, there are major gaps in forest information and monitoring. While investments are needed to support FMP development and implementation, such a process needs to be accompanied by an improved forest information and monitoring system, to enable transparent forest monitoring and management, improve sector learning, and reduce illegal forest use.

Evolution of FIMS and key institutions

Acknowledging the various limitations due to inadequate forest information and monitoring, the government has prioritized developing a credible and robust forest information and monitoring system (FIMS). In 2017 a Forest Inventory Task Force (FITF) (now Forest Inventory Planning and Monitoring Working Group – FIPM-WG) was set up in MoEPA, which is responsible for the establishment of a Forest Information and Monitoring System for Georgia, along with the planning and eventual oversight of the implementation of the National Forest Inventory, and improved Forest Management Inventories (FMI). Since then, substantial inputs have been invested in designing the FIMS concept, which was integrated into the new (draft) forest code. A multi-stakeholder working group on Forest

³⁹² There are regulations for drones in Georgia that note that drones may only ascend to a height of 120m, they can only be operated within the direct line of site, if drones weigh over 5kg they must have permission from the National Aviation Authority, a distance of 50 m to people, roads, railways and buildings must be reserved, among others. Note: Permits are necessary for drone operation, however they are easy to obtain from the National Aviation Authority. DES has not had problems to obtain such permits in the past.

Information Systems is also included within the National Forest Program Process, providing increased cooperation with academia and other stakeholders on matters related to FIMS. EIEC is the host of FIMS. Once FIMS is fully operational, it is expected that there will be at least 36 users within 6 institutions:³⁹³

- NFA (HQ departments and regional offices)
- DES (HQ and regional offices)
- Adjara Forestry Agency (HQ departments)
- APA (HQ departments)
- Tbilisi City Hall (Forest Police Division)
- MoEPA (departments)

FIMS Design

FIMS is being designed as a system that “...pools and systematizes documents containing information on the forests of Georgia, their protection, reforestation, afforestation and forest use”.³⁹⁴ The system will not only help bridge forest information gaps, and enable the adoption and monitoring of SFM in Georgia, but it will also support Georgia’s monitoring of national (e.g. 3rd NEAP) and international commitments (e.g. Georgia’s NDC). FIMS will improve the credibility, transparency, accuracy and robustness of emission reporting in the LULUCF sector and will further strengthen monitoring and reporting on NDC implementation (for both adaptation and mitigation measures).

In order to establish a modern, comprehensive and flexible Forest Information and Monitoring System, FIMS, a set of different software modules are proposed within the concept (Table 39). The modules and respective (spatial) databases are connected by interfaces with pre-defined standards for data exchange. The modules of the FIMS shall cover the most important business processes and information needs in the Georgian forest sector (Figure 55):

³⁹³ However, the specific bylaw and institutional arrangements for FIMS still needs to be elaborated in the coming years.

³⁹⁴ New (draft) Forest Code, version submitted to Parliament in February 2019.

Table 39: Comparison of BAU practices with Proposed FIMS modules

FIMS Module	BAU (prior to the existence of FIMS and its modules)	FIMS Module Purpose	FIMS Module Benefit
Cadaster and land registration	<ul style="list-style-type: none"> Land registration not always clear, often may only be available in hard copy 	<ul style="list-style-type: none"> The forest management is based on land parcels, which need to be defined by the cadaster and land registration. These land parcels are the basis for all forest maps. 	<ul style="list-style-type: none"> If cadastral boundaries are unclear in the field, the FMP process allows to clarify discrepancies and to update the digital cadaster.
Forest Resource Database	<ul style="list-style-type: none"> Lack of a comprehensive forest resource database, information on forests are scarce (FMPs often non-existing or extremely outdated, etc.) 	<ul style="list-style-type: none"> Forests and forest structures are described in stands as homogenous spatial units and smallest entities for a sustainable management. Stand descriptions for the public forests in Georgia are created during (3b) <u>Forest Management Planning</u>, making use of (3a) <u>Forest Management Inventories</u> (tree data, point sampling). 	<ul style="list-style-type: none"> Improved forest database with detailed information on forest management plans, as well as forest management inventories. This will support NFA to continuously monitor FMP development and implementation, as well as the overall status of forest resources. It further supports DES in investigating and supervising forest use.
National Forest Inventory	<ul style="list-style-type: none"> No recent NFI, lack of forest information (see Chapter 5.1.3) 	<ul style="list-style-type: none"> This process derives point sampled and mapped data for the whole forest area in Georgia, even where no FMP is existing. It provides the overview on the total forest resources of the country 	<ul style="list-style-type: none"> Overview of forest resources in the country, improving transparent adaptive planning, management and monitoring in the sector.
Forest Site Mapping	<ul style="list-style-type: none"> FMPs rarely exist, and forest management is often conducted based on ad-hoc annual plans. Without FMPs NFA-managed forests are often not mapped or zoned, which limits management planning considering key forest conditions and management objectives for multi-purpose forest use 	<ul style="list-style-type: none"> A central mapping process of soil, terrain and climate allowing to evaluate growth conditions tree species suitability and risks at each location, where forest grow or might grow. 	<ul style="list-style-type: none"> Transparent and accessible database on forest conditions, supporting the evaluation of growth conditions, and other biogeographical conditions that affect forest health and quality.
Forest Function Mapping	<ul style="list-style-type: none"> Limited information on forest sites, that limits monitoring and learning related to implemented practices. It further limits planning. 	<ul style="list-style-type: none"> Legal restrictions occur for forest management from outside the sector (water protection, nature protection) and inside (Mountain protection, forest, buffer zones defined in the forest code). The process provides an overview of zones accounting for different forest functions, permitting the identification of optimal management strategies for all respective forest stands. 	<ul style="list-style-type: none"> Clarifies forest use zones, enabling monitoring of permitted activities, and improved monitoring and learning based on implemented management strategies.

FIMS Module	BAU (prior to the existence of FIMS and its modules)	FIMS Module Purpose	FIMS Module Benefit
Utilization rights	<ul style="list-style-type: none"> Utilization rights may not be clear, and may be limited to hardcopies, making forest supervision and management challenging 	<ul style="list-style-type: none"> Rights given and referring to certain forest stands or parcels that need to be mapped and managed. 	<ul style="list-style-type: none"> Clarifies forest utilization rights, of particular reference in case of disputes or issues in regards for environmental liability.
Forest Operations	<ul style="list-style-type: none"> Lack of supervision and control over timber value chains due to the lack of transparency, Annual plans for forest management are often hardcopies, which mean that key data and information is often lost Information on revenues and costs not linked with timber processed volumes, resulting in a key gap for overseeing wood value chains 	<ul style="list-style-type: none"> Including the Electronic System of Timber Resources Management” Covers annual planning based on the stands defined in the forest register, and records daily implementation processes for the harvesting of timber products, non-timber forest resources, and forest operation activities pertaining to forest management (reforested areas, etc.). The costs and revenues, as well as all pertinent business information will be managed in this module, and it will be linked to NFAs and forest enterprises’ accounting systems. 	<ul style="list-style-type: none"> Provides information on chain of custody and implemented activities from harvesting until sale to the consumer. This improves awareness and monitoring of implemented management activities, transportation, processing, and sale (more transparent accounting – costs and revenues). Business information will improve sector transparency and accountability.
Forest Incidence Monitoring	<ul style="list-style-type: none"> Scattered databases and incidence register, limits the monitoring and adaptive planning and response to such events/incidences. 	<ul style="list-style-type: none"> Unplanned, incidental changes of forests (e.g. by pests, storm, snow, grazing, fire and illegal logging, among others), will be observed and logged in this module. Alert processes will be generated to support enhanced supervision, as well as contingency planning, and sanitary or restitution measures. 	<ul style="list-style-type: none"> Improve forest supervision by strengthening DES’s database on illegal activities, as well as other changes in forest area or quality. This will improve forest supervision, and promote active management (contingency planning, and responsive-measures)

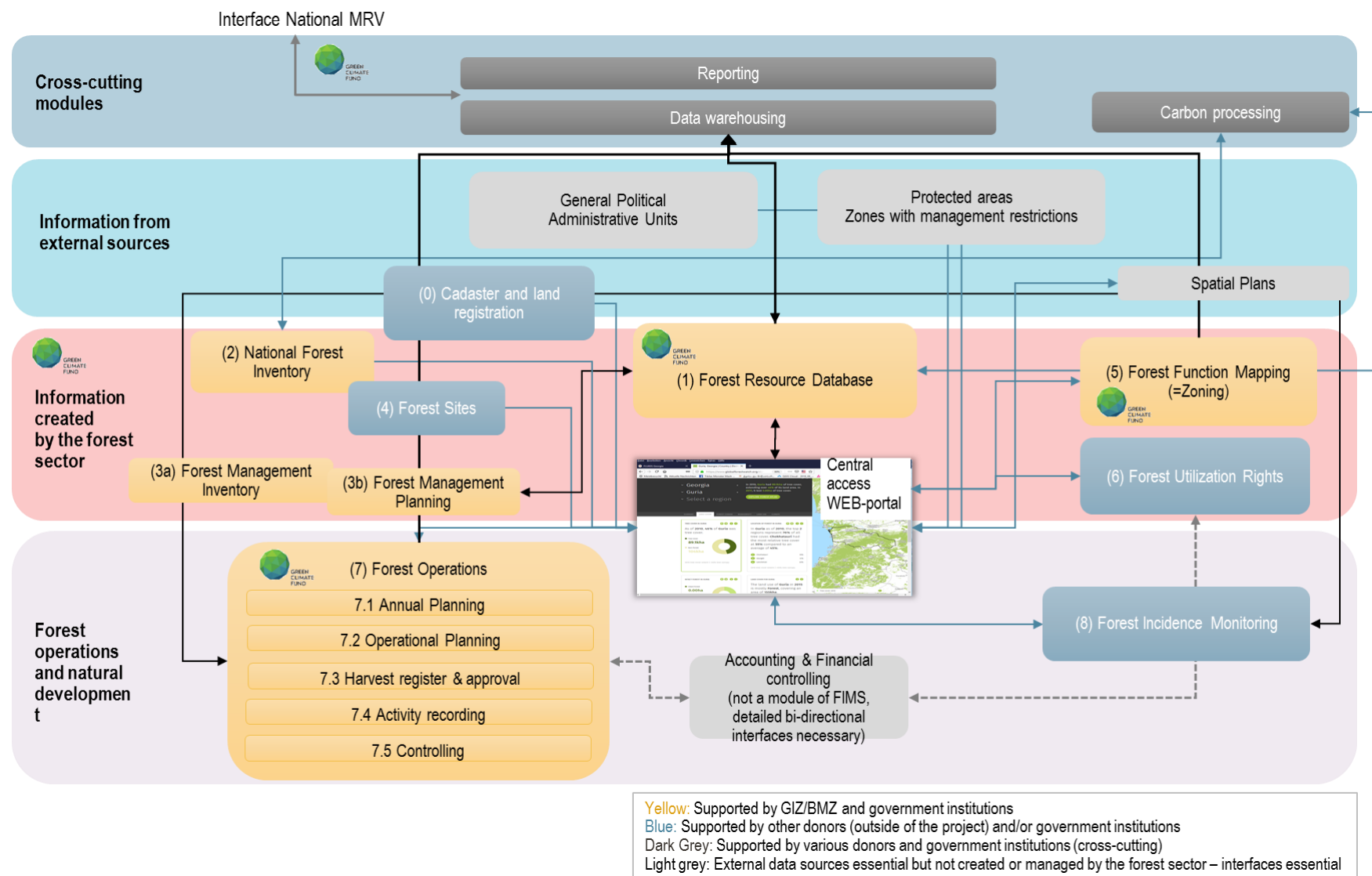


Figure 55: Overview Georgia's FIMS Concept

Barriers for the development and operationalization of FIMS:

- **Lack of national emission factors:** The shift from Tier 1 to Tier 2/3 emission factors is one of the key principles under the Transparency Framework for Action and Support, supporting national accounting and reporting.
- **Insufficient harmonization of NFI data and the country's GHG inventory:** Variables collected, timing of collection, and other elements need to be harmonized to improve the robustness and comparability of the NFI data and the country's GHG inventory. FIMS is a key mechanism to support this, however additional work is needed to support SOPs, guidelines, trainings and software module development
- **Inconsistencies between official data and field data:** Statistics can differ on national website versus department statistic databases. There is a need to improve standardized procedures for data collection, and guidance is needed for staff on how to work with data inconsistencies. SOPs, guidelines, protocols, regulations and related trainings are needed to support the operationalization of FIMS, and support improved data collection, and robustness.
- **Insufficient capacities on monitoring and MRV across key institutions:** Ongoing capacity development support has been provided in the FIMS development process, and coordinated support will be needed as it is increasingly operational.
- **MRV roles and responsibilities are not comprehensively elaborated and assigned:** While concepts for improved institutional set-ups (i.e. FIMS concept) exist, support is needed for putting such concepts into practice (clearly defining revised institutional mandates in official decrees, establishing SOPs, and awareness raising and training on the revised institutional set up).
- **Need for continued financial and technical support for module development:** Majority of modules are not yet operational and need further work on module design and development (conceptual planning, software development, piloting and refining the modules). See Chapter 5.2.4 for more detailed information on government institutions' budgets.
- **Insufficient government budget to cover hardware investments:** Government budget is only sufficient to cover part of the up-front investments in hardware needed to run the system. See Chapter 5.2.4 for more detailed information on government institutions' budgets.

5.2.3.4 Forest Management

5.2.3.4.1 Development of Forest Management Plans (FMP)

All forest districts will require FMPs, based on up to-date inventories and forest information. With the forest sector reform, requirements for FMP planning, development and approval will become more stringent.³⁹⁵ All FMPs will have to be developed in compliance with the requirements of the decree on "Rule of Georgia's Forest Inventory System and Monitoring", and revised regulation 179, among others. The Forest Management Inventory currently being conducted in Akhmeta, with support from GIZ, is piloting a new standard of systematic sample plot assessment forest inventories, which will serve as an early example of implementing such an approach. Thus, it is anticipated that forest sector reforms will enable the regular and consistent development, implementation and monitoring of FMPs – creating a strong foundation from which SFM can be implemented, whilst enabling improved learning and knowledge management in the sector.

³⁹⁵ Detailed steps for FMP planning are described in Chapter 6, within Activity 1.1.

In addition, FMPs will be designed in a more participatory approach. Article 17 of the new (draft) forest code states *“Stakeholders have the right to participate in the decision-making process pertaining forest management, where the identity and culture of communities residing in the vicinity of forests as well as traditions of forest management should be considered.”* Taking into account needs of the local population, relevant territories can be allocated for grazing in the state forests, except for the cases when it is impossible due to the functional purpose and condition of a forest.³⁹⁶ It notes grazing areas and quotas are to be established in either FMPs or Annual Use Plans, and that appropriate signage should be placed to indicate their boundaries. Thus, the participatory process gives local community more say into FMP development, ensuring that their priorities and needs are also considered.

This will have a major impact on forest management, as it transitions from annual ad-hoc planning to detailed forest management planning, with an overarching 10-year plan and annual planning aligned with the FMP. Ultimately, this will ensure that the annual allowable cut (AAC) is based on forest information and sustainable levels. It further will guide the implementation of management practices, based on revised guidelines (see following sub-chapter), and ensuring that practices selected are suitable for the forest type and site-specific conditions (environmental conditions, level of degradation, etc.). FMPs, combined with FIMS will also improve monitoring in the sector, permitting adaptive management, learning and documentation of lessons learned, as well as improved transparency within the sector.

Barriers for FMP development

The following are considered key barriers for FMP development under the new reform:

- **Weak local stakeholder capacities and vulnerable rural households:** Engaging local people in the FMP process is a positive step forward, however additional technical support is needed for local people to build their capacities to participate in such a process, ensuring they understand their rights and available opportunities. In addition, given the vulnerability of households, it is recommended that additional livelihood support is provided to local communities, that promotes sustainable rural development in and around state forest areas.
- **Insufficient knowledge of forest management bodies and MoEPA:** The knowledge and experience of staff members of institutions to develop FMPs on the new concept is limited. Intensive capacity building is required to enable the relevant institutions to develop quality plans.
- **Insufficient finance to develop FMPs for all districts:** See Chapter 5.2.4 for more detailed information on NFA and MoEPA’s budgets.

5.2.3.4.2 Improved SFM practices based on revised regulations

Based on the revised regulations for forest management (179, 241 and 242), which will be aligned with the new forest code, and to be approved management-level C&I for ecosystem-based forest management, ecosystem-based forest management will have a stronger legal basis enabling the adoption of international best practices that are suitable for the Georgian context. Ecosystem-based forest management is expected to generate substantial benefits not only in terms of enhancing carbon stocks and reducing degradation, but also in supporting the sustainable provision of fuelwood, timber and non-timber forest resources, strengthening the resilience of forest ecosystems, and improving the provision of other forest ecosystem services. The Table on the next page provides a comparison of

³⁹⁶ Use of designated grazing territories may be temporarily restricted based on the decision of a body responsible for forest management, if this is necessary to allow the implementation of forest protection, maintenance or reforestation/afforestation activities.

BAU practices with examples of potential improved practices that could be promoted through regulatory and legal revisions.

Based on approved FMPs, planning will take into consideration diverse conditions on the ground that will require a combination of targeted practices (incl. natural regeneration, enrichment planting in some highly degraded areas, grazing control in areas with high pressure from livestock, etc.). The following Figure provides an example of potential ecosystem-based forest management interventions using an image from Lanchkhuti's FMP that demonstrates the diverse conditions on the ground, and the need for targeted practices based on actual forest conditions.

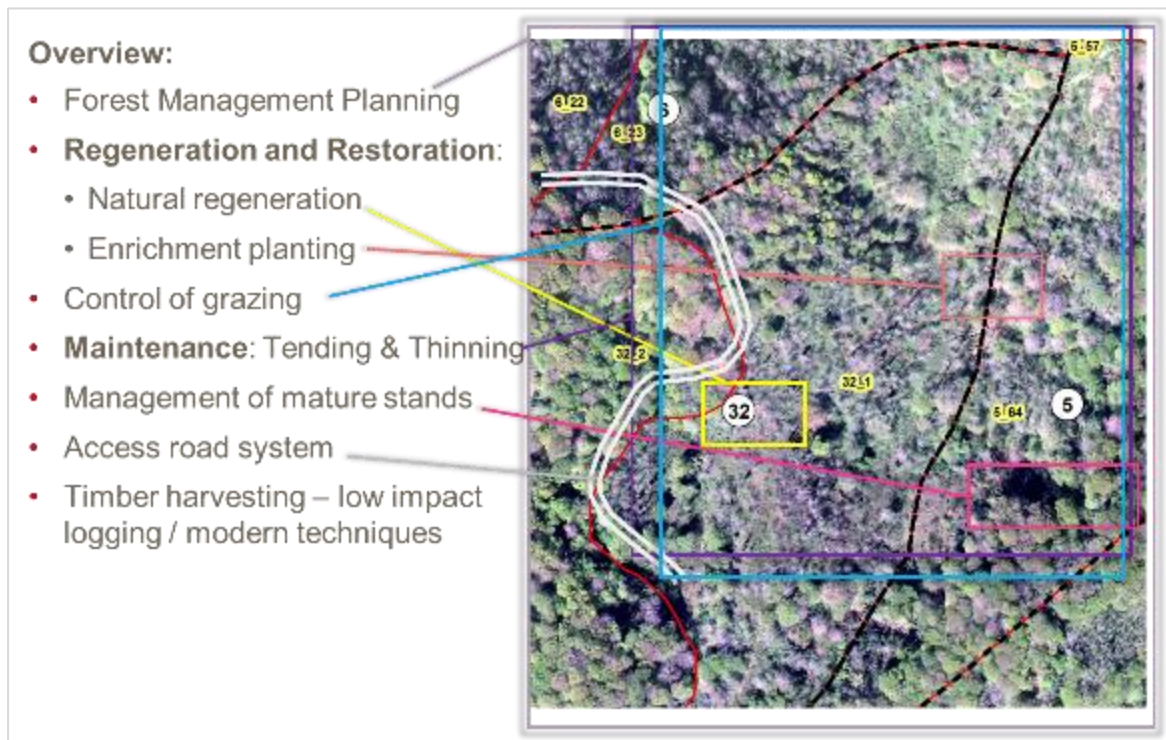


Figure 56: Example of potential targeted ecosystem-based forest management interventions using an aerial photo from Lanchkhuti's FMP

Table 40: Overview of business as usual practices, improved practices for SFM and benefits of adopting improved practices

Measures	BAU	SFM ³⁹⁷	Benefits
Forest Management Plans	<ul style="list-style-type: none"> Only 4 of 8 forest districts are in the process of developing FMPs (should be available by project start). Existing FMPs are limited due to lack of a statistically sound and periodically updated inventory, and lack of budget and capacities. Models used in FMPs are often do not utilize realistic increments, as a simplified average increment is often calculated instead of the current increment. As a result, the increment estimation is often negatively biased. SFM, in particular ecosystem-based forest management, measures were often not planned in the new FMPs as the regulations in the respective regulations 241 and 242, do not easily allow an active management by tending and thinning, especially if forest stands are very degraded resulting in a classification as “low density.” (see following rows on maintenance cuts)³⁹⁸ 	<ul style="list-style-type: none"> SFM, in particular ecosystem-based forest management, to be based on detailed forest management plans (FMPs= developed for all districts. FMPs will be aligned with the new forest code, and secondary legal acts (to be revised after the approval of the forest code - incl. 179, 241 and 242). Such a process will further include: a statistically sound FMI, mapping of forest zones based on forest functions, and consultation with stakeholder as a basis for the mapping of forest zones, among other steps. A participatory approach will be implemented involving local stakeholders, improving cooperation and communication Annual plans to be developed and approved, prior to the implementation of activities on the ground, and will include targeted measures to address pests and diseases present. 	<ul style="list-style-type: none"> Information base to implement the new ecosystem-based forest management approach, including improved forest planning, management, monitoring and evaluation. Improved management of forest biodiversity Adaptive forest planning, considering climate risks and suitable adaptation strategies (in areas where related studies are available, and inform FMPs and related guidelines, protocols, and training modules) Strengthened local stakeholder engagement
Regeneration and restoration activities³⁹⁹	<ul style="list-style-type: none"> Only 3.4 ha reforested in project region from 2013-2017. Current management practices have led to the persistence of degraded, low quality forests, characterized by low productivity. Limited interventions due to lack of budgets for active restoration and regeneration of forest structure and 	<p>Restoration of low quality and degraded stands combining:</p> <ul style="list-style-type: none"> Natural regeneration, wherever possible Removal of shrubs or shrubby undergrowth Promotion of native and site-adapted (incl. climate resilient) tree species 	<ul style="list-style-type: none"> Fully stocked stands Species match site and natural forest vegetation type Enrichment with desired and fast-growing resilient species

³⁹⁷ SFM practices have been identified based on consultations with project partners, revision of literature and key documents – including the new (draft) forest code (version submitted to Parliament in February 2019, the National C&I for SFM, and the management-level C&I for ecosystem-based forest management, among other documents. Once the forest code is approved, key regulations for SFM (Regulations 179, 241 and 242) will be revised, and **all activities will be cross-checked to ensure compliance with the revised legal and regulatory framework.**

³⁹⁸ „Density“ is a classification of forest stands by the relation of the „normal“ basal area with the existing basal area. A fully stocked stand has a density of 1.0, degraded stands show a density of below 0.7. Very often values below 0.5 could be found in the analyzed actual FMPs.

³⁹⁹ In Georgia, the following words “regeneration and restauration” considers: “regeneration, rehabilitation, restauration, reforestation and afforestation” Regeneration and restauration is regulated in 241 (Section III: Reforestation Activities (Art.22-38)), very detailed information is provided for artificial activities = Planting or Seeding (Art. 30-38). Within territories where possible, reforestation through facilitation of natural regeneration³⁹⁹ should be favored.

Measures	BAU	SFM ³⁹⁷	Benefits
	<p>increased density. As FMPs and respective inventory data were lacking in all of the 8 districts until 2017, a restoration and regeneration program has not been set up.</p> <ul style="list-style-type: none"> Limited grazing control measures and limited coordination with local communities. In some instances, fencing is used, however this is very limited, and has reduced forest regeneration and restoration in some regions (esp. in Guria, and Dedoplistskaro within the project area). 	<ul style="list-style-type: none"> Early selection of appropriate, site adapted and resilient tree species from natural regeneration with focus on high value species (e.g. more oak, horn-beam as second layer) Enrichment planting with native site-adapted high value tree species where natural regeneration is not suitable Grazing control (e.g. guarding, herding, improved pasture measures discussed with communities, rotational grazing, restricted grazing in critical seasons, improved communication with communities) Weeding and early maintenance (selective), where needed 	<ul style="list-style-type: none"> Climate resilient species maintained Reduced damage to young, regenerating forests New re-stocked areas (from density 0.5 towards 1.0) Higher volume Higher value Higher growth rate Higher carbon stocks Improved resilience to climate change in forest ecosystems
Maintenance cuts (tending and thinning ⁴⁰⁰)	<ul style="list-style-type: none"> Maintenance cuts as tending and thinning that enable improvements in stand quality, growth and species composition cannot be planned in degraded stands with densities < 0.7 due to restrictive regulations in the regulation 241 on maintenance cuts. The option to assign them as necessary sanitary cuts is often not applied (Regulation 241). 	<ul style="list-style-type: none"> Maintenance cuts and other cutting operations will promote the development of natural forest types with high quality timber and without weakening the natural potential of the forests. Maintenance cuts should be applied in appropriate situations where the quality of the forest needs to be improved (e.g. improvements in terms of tree species mixtures to come closer to natural stand composition, where the vertical and horizontal structure need to be optimized to meet ecosystem services [e.g. in protective forests]) Maintenance fillings (incl. thinning and tending) applied in appropriate situations where quality needs to be improved, for example:⁴⁰¹ where tree species mixture needs to be improved where vertical and horizontal structure need to be optimized to meet ecosystem services (protective forests) 	<ul style="list-style-type: none"> Support of future crop trees and resilient species of the natural forest vegetation types (native, site-adapted and resilient species) Higher value Higher growth rates Higher volume Higher carbon stocks Adaptation to climate change through more resilient forest ecosystems

⁴⁰⁰ The term “maintenance cuts” includes: lighting (up to 10 years), cleaning (11-20 years), thinning (21-60 years) and passage felling (age of 61 and older).

⁴⁰¹ For more detailed information on permitted and prohibited practices, refer to Management-level C&I, Criterion 2 (including associated indicators and legal text provided).

Measures	BAU	SFM ³⁹⁷	Benefits
Management of mature stands (stand conditions are existing, but it is not a matter of access alone)	<ul style="list-style-type: none"> ▪ Mature forests are often not managed due to lack of forest roads or skidding roads, and insufficient capacities and budgets. ▪ In some instances, the level of degradation is low, and the density of stands is comparably high. In case of mature stands with a low density (< 0.6), harvesting and systematic regeneration is often not planned as the open spaces are often covered with shrubs or evergreen undergrowth, such as blackberry and fern. In this case cuts shall not be planned unless a removal can be financed (Regulation 242). 	<ul style="list-style-type: none"> ▪ Existing mature stands are often located in areas with limited accessibility. By improving access: ▪ More forest area can be sustainably managed, and pressure on other forest areas is reduced ▪ Selective extraction of timber of low quality for fuelwood, and harvesting of mature quality timber (enabling sorting and differentiation of timber categories I, II, III and IV (the latter as fuelwood)). ▪ Stands are naturally regenerated following an approved management plan 	<ul style="list-style-type: none"> ▪ Vitality, stand structure and composition is improved ▪ Higher value and more wood products ▪ Vital and preserved forests ▪ Adaptation to climate change
Forest infrastructure (including forest access roads and skidding trails)	<ul style="list-style-type: none"> ▪ Regulations do not require the construction of resilient low-impact forest infrastructure. ▪ In addition to the construction of poor-quality infrastructure, there is a lack of systematic tractor road system and generally, there are limited investments in access roads. This leads to spot-wise overexploitation, degraded soil and soil erosion⁴⁰² <ul style="list-style-type: none"> ○ From 2015 to 2017, following total of forest roads were rehabilitated in the project target regions: Guria: 38.77 km, Kakheti: 4.48 km, and Mtskheta-Mtianeti: 59.94 km 	<ul style="list-style-type: none"> ▪ Access road systems – precondition for a sustainable forest management. They should be: ▪ Planned systematically during FMP and operational planning, where the improvement of existing skidding lines and forest roads have preference. ▪ Built so that they are landscape oriented and with lowest environmental impacts, utilizing suitable techniques (preference to practices which prevent vegetation and soil from damage) ▪ Regularly maintained to avoid erosion, destruction, and limited forest areas 	<ul style="list-style-type: none"> ▪ More forests area sustainably managed ▪ Reduced pressure to harvest along existing roads ▪ Through maintenance reduced soil erosion and water run-off ▪ More-resilient roads lead to less maintenance costs

⁴⁰² Patarkalashvili 2016; World Bank 2018.

Measures	BAU	SFM ³⁹⁷	Benefits
Final cutting operations ⁴⁰³ (timber harvesting)	<ul style="list-style-type: none"> Timber extraction without considering low impact logging. Regulation 242 contains some, but not a comprehensive prescription for best practice reduced impact logging operations. Successful implementation is often lacking due to inappropriate equipment and machinery, as well as low skills of forest workers. Insufficient incentives for service companies to adopt low impact practices (lack of training, and enforcement), insufficient and poorly constructed access roads further limit cutting operations and management. Higher quality timber often used for fuelwood (inconsistent sorting), harvested wood often not properly dried reducing the efficiency of fuelwood, higher quality sawn wood, no centralized sites or yards for registration, sorting, drying or storage. 	<ul style="list-style-type: none"> Low impact logging is implemented by a combination of: improved forest access systems; optimal harvesting techniques (e.g. “adapted harvesting systems” for mountain conditions, broadleaved tree species, accessibility, dimension of trees); Investments in new harvesting equipment, including equipment to support low-impact use; and educated, equipped (i.e. with safety equipment), and trained forest workers All timber transported to Business Service Yards, yards where timber is registered, sorted, air dried, fuelwood chopped, and stored. This enables improved tracing of harvested wood, and more efficient use of wood (where low-quality wood is prioritized for fuelwood use, and high-quality timber for the wood industry). 	<ul style="list-style-type: none"> Healthy stands, reduced erosion and environmental damage due to the adoption of low-impact practices Improved wood quality and management (better harvesting practices, transportation, sorting and storage), that leads to higher revenues Improved occupational health and safety for forest workers Improved energy efficiency with dried logs Higher growth rates, volumes and carbon stocks
Improved monitoring, preventing and fighting regarding Forest pests, diseases and fire	<ul style="list-style-type: none"> Even if pests and diseases as well as forest fires are seen as important factor of threat, no systematic monitoring due to lack of an information system (Incident module), to less staff on the ground, lack of FMP and low accessibility is existing. That leads to an unknown degree of damages and degradation of forests. Forest fire detection, fighting and prevention measures are suboptimal due to the above-mentioned reasons. In addition, investments in equipment and facilities are missing. 	<ul style="list-style-type: none"> Improved monitoring of pests and diseases, integration of related precautionary and control measures integrated into FMPs and annual plans Sanitary cuts implemented as needed to control and limit the impact from pests and diseases Targeted ecosystem restoration measures implemented, based on FMPs and annual plans, in areas impacted by pests, disease and forest fires. Forest fire equipment procured will improve the effectiveness of controlling forest fires. Information on fire-smart practices (for prevention and control) to be cross-cutting in trainings.⁴⁰⁴ 	<ul style="list-style-type: none"> Healthy stands Improved monitoring that contributes to resilient and active management Improved resilience to climate change Reduced damages due to pest, disease and forest fires (incl. to environment, economy and human lives and livelihoods)

⁴⁰³ In Regulation 242, Chapter III. Rules of Cutting Area Marking, Allocation and Timber Production: Art. 9. – 12”

⁴⁰⁴ UNDP is planning an Adaptation Fund project proposal on “Increased climate resilience in South Caucasus mountain communities and ecosystems through wildfire risk reduction” covering Armenia and Georgia. The project aims to increase the resilience of mountain communities and forest ecosystems on which they depend to climate induced hazards through sustainable fire management practices and capacity building. The regions in Georgia are not identified yet (as of March 2019).

Info Box 15: Low / Reduced Impact logging⁴⁰⁵

“Reduced impact logging (RIL) is the intensively planned and carefully controlled implementation of timber harvesting operations to minimize environmental impacts on forest stands and soils. It involves a number of practical measures, such as:

- Pre-harvest forest inventories and the mapping of individual crop trees
- The pre-harvest planning of roads, skid trails and landings to minimize soil disturbance and to protect streams and waterways with appropriate crossings
- Pre-harvest vine-cutting in areas where heavy vines connect tree crowns
- The construction of roads, landings and skid trails in accordance with environmentally friendly design principles
- The use of appropriate felling and bucking techniques, such as directional felling, cutting stumps low to the ground to avoid waste, and the optimal crosscutting of tree stems into logs in ways that maximize the recovery of useful wood
- The winching of logs to planned skid trails, ensuring that skidding machines remain on trails at all times
- Where feasible, the use of yarding systems that protect soils and residual vegetation by suspending logs above the ground or by otherwise minimizing soil disturbance
- Conducting post-harvest assessments to provide feedback to resource managers and logging crews and to evaluate the degree to which RIL guidelines have been applied.

In addition to the environmental benefits, RIL has been shown to reduce the percentage of “lost” logs (those trees felled in a forest but not extracted because they are not seen during skidding or yarding operations), thereby reducing timber wastage and increasing revenue.”

5.2.3.4.3 Sustainable Forest Management model

With the planned roll out of ecosystem-based forest management based on the new forest code (once approved) and revised policy framework, substantial planning has been conducted to understand the technical, financial and institutional implications of the reform.

A forest model⁴⁰⁶ was elaborated by the project development team to support project design and planning – modeling the technical, financial and institutional implications of rolling out of the Georgian approach of ecosystem-based forest management under the New (Draft) Forest Code and the adjusted secondary regulations and ecosystem-based forest management activities in the 8 target districts. It compares the baseline situation with an ecosystem-based forest management scenario for forest management practices (including those highlighted in the previous sub-chapters), and further considers costs for transportation, and the new fuelwood and timber provision mechanism via Business Service Yards. It considers diverse factors such as staff (numbers, capacities for both NFA and private sector contractors), equipment (for both NFA and private sector contractors), infrastructure investments (forest road and skidding road construc-

⁴⁰⁵ ITTO 2019.

⁴⁰⁶ Given the exclusion criteria described in Chapter 4, the resulting management area where more intensive ecosystem-based SFM interventions will be implemented is 157,359 ha.

tion), investments for the implementation of ecosystem-based forest management), and operation and maintenance costs associated with ecosystem-based forest management, among others.⁴⁰⁷ While all models are “*simplifications of reality*”,⁴⁰⁸ the approach applied utilized tools and best practices for ecosystem-based forest management modeling whilst ensuring that they were adequately adapted for the Georgian context, considering the Management-level Criteria and Indicators for Ecosystem-based Forest Management, particularly in the 8 target districts, through the application of a participatory approach.

The following sub-chapters present the forest model, based on the proposed NFA management model, for the roll-out of ecosystem-based forest management within the project area.

Assumptions and data sources

As described in Chapter 5.1, the lack of forest information, particularly the lack of forest inventories in the project districts, is a major barrier for forest management planning and modeling. Assumptions, thus, had to be made in various instances and have been clearly documented and discussed with project partners in Georgia. The following Table provides an overview of key assumptions and sources that have been utilized by the model. The model and its assumptions were developed in a participatory manner, engaging the NFA and MoEPA throughout the process, including discussions on assumptions, data, and whether or not the findings are realistic and feasible - ultimately ensuring alignment with government plans for the forest sector reform, whilst considering what is feasible given the local context.

Table 41: Overview of information and assumptions used for the forest model

Description of Information / Assumptions	Sources
Management area where SFM interventions shall be implemented (157,359 ha)	<ul style="list-style-type: none"> Detailed methodology described in Chapter 4 (considering exclusion factors in areas above 2,000m and on slopes above 35°)
Dominant forest formation type – named by main tree species (national level composition used): <ul style="list-style-type: none"> Beech: 51%; Oak: 12%; Hornbeam: 11%; Fir: 8%; Alder: 6%; Spruce: 5% 	<ul style="list-style-type: none"> Urushadze et al. 2016. Carbon stocks in the main Georgian forest formations.
Age classes	<ul style="list-style-type: none"> Distribution used from 2 recently elaborated FMPs (Lanchkhuti and Akhalcikhe [the latter for conifer tree species]), and 2 old FMPs (Tianeti [2003] and Akhmeta [2003] for Eastern Georgia)
Density and the link to degradation (composition for each forest formation type and age class)	<ul style="list-style-type: none"> Composition from 2 recent FMPs (Lanchkhuti and Akhalcikhe)
Increment (data for respective age and site index weighted by density)	<ul style="list-style-type: none"> Georgian Yield Tables from the forest taxation guideline developed by Mirzashvili and Kufaradze (1955)

⁴⁰⁷ The financial and economic analysis of the forest reform is presented in Chapter 8, whereas the focus of this chapter is on the technical characteristics.

⁴⁰⁸ Sturtevant et al. 2007.

Description of Information / Assumptions	Sources
Yields: Maintenance Cuts and Thinning ⁴⁰⁹	<ul style="list-style-type: none"> Harvesting rates derived from above mentioned Georgian Yield Tables (Mirzashvili and Kufaradze 1955)
Yields: Final harvest (maturity > 120 years of age, 20-year regeneration period) <ul style="list-style-type: none"> Extraction efficiency of standing to extracted volume: 80% Ratio extracted to sold volume (m³/ha): 93% Increase factor for harvest rate for the 2nd FMP period: +10% 	<ul style="list-style-type: none"> Expert info, MoEPA and NFA working group discussions
Average transportation distance to BSY 15-25 km	<ul style="list-style-type: none"> Expert info, MoEPA and NFA working group discussions

For the dominant forest formation types, based on age classes and other factors such as the level of degradation, a list of suitable forest management practices was elaborated (see Table in Appendix 6). They are best practices for ecosystem-based forest management that are adapted to the Georgian context and specific forest conditions (considering factors such as stand age, the level of degradation, and density, among others). Given the history of forest degradation during the past decades, the forest structure has been substantially altered in many forest areas in Georgia, thus requiring targeted interventions that promote the development of natural forest types and structures (incl. diverse age classes, and species composition), with high quality timber and without weakening the natural potential of the forest. The best indicator for degradation is the low density of forest areas, where density describes the relationship between the forest's existing standing volume, and the standing volume of a properly managed stand.⁴¹⁰ Thus, it is key that selected measures⁴¹¹ focus on the restoration of degraded forest areas, in terms of both quantity and quality.

The project offers the opportunity to improve the capacities for ecosystem-based forest management, aiming at raising standing volume and increment, resulting in improved carbon storage).

⁴⁰⁹ From the (draft) Management-level C&I for Ecosystem-based forest management "The term 'maintenance cuts' includes lighting up to 10 years, cleaning (11-20 years), thinning (21-60 years), and passage felling (age 61 and older)", p. 2.

⁴¹⁰ As described in yield tables, such as those developed by Mirzashvili and Kufaradze, 1955.

⁴¹¹ These practices have been cross-checked against the national and management-level C&I described in Chapter 5.2.2, and the new (draft) forest code, however they will have to be cross-checked against regulatory revisions made after the forest code is adopted and prior to project approval (namely regulations 241, 242 and 179). All practices implemented for the project will be based on the legal and regulatory framework in the country, and will need to be approved by the Government of Georgia (within FMPs and Annual Action Plans).

Revised management structure to roll out ecosystem-based forest management on NFA-Managed Forest Land

Gradual phasing up of ecosystem-based forest management activities

The implementation of ecosystem-based forest management requires an approach that ensures a learning curve based on the gradual scaling up of activities, that accounts for substantial time and resources to be invested early on in capacity development and infrastructure that facilitates SFM, in particular ecosystem-based forest management, in the future. First of all, by year 1 of project implementation it is expected that only 4 districts will have approved or nearly approved FMPs. The development of new FMPs in the remaining four districts will require training on new regulations, and will be carried out over a period of two years, considering staff capacities.

In addition, access roads are considered a main limiting factor for the adoption of SFM in Georgia, and it will take time and resources to develop a suitable forest access road network that enables SFM (ensuring detailed planning, capacity development on low-impact and resilient construction, among others). At the same time, the rollout of SFM, in particular ecosystem-based forest management, will require substantial investments in hiring new staff and training existing and new staff on ecosystem-based practices, and revised regulations and standard operating procedures.

Considering these challenges, in the project's 8 target districts it will take nearly 7 years to reach nearly full operating capacity for the full and effective implementation of ecosystem-based forest management measures (see Forest Model excel file for more detailed information).

Staff and equipment requirements for rolling out ecosystem-based forest management

By the end of 7 years, it is expected that the implementation of SFM in the project districts will result in the creation of 518 new jobs (608 if the 90 business service yard (BSY) staff are included – see following sub-chapter for a description of the BSY mechanism) – mainly forest workers implementing measures of forest restoration, but also forest work specialists⁴¹² jobs related with harvesting, timber transport and forest road building and maintenance. In addition, around 270 positions for service contractors to implement forest management activities (based on a 30% NFA – 70% Private Contractor split) will be created. As NFA becomes responsible for implementing SFM on NFA-managed forest land, they will need to develop a revised management structure at the regional and district level to enable efficient and effective roll out of SFM, especially ecosystem-based forest management practices. With its new mandate, NFA expects to conduct 30% of forest management activities in-house (e.g. tending, cutting operations, low impact forest road building and maintenance), and will contract out 70% of the work to private sector companies. The following paragraphs provide more information on key considerations for both NFA and private sector contractors.

⁴¹² The term "Forest Worker" is officially used in the forest code, whereas vocational education and training courses at colleges use the term "Forest Work Specialist" to make the profession sound more appealing. They are referring to the same profession.

NFA

In order to manage 30% of management activities, NFA will need to hire additional staff, and train all staff on SFM, especially ecosystem-based forest management. Rolling out SFM in Georgia will require setting up specialized teams within regional forestry service offices, with distinct tasks for which they are responsible. Within the project's target districts and based on the aforementioned forest model, the following specialized teams within NFA are necessary to support the roll out of ecosystem-based forest management:

- **Restoration and maintenance:** ~6-7 teams per region (46 total) with 8 staff per team (368 staff total), plus an additional 8 teams for enrichment planning consisting of 2-3 teams per region, with 7-8 staff per team (60 staff total). Equipment needed includes off-road vehicles, soil drilling devices, and seed planting devices (per team). Within each region firefighting equipment is needed including water tanks, and a mobile fire extinguisher. Teams will need to be trained on revised regulations, SOPs, and best practices for ecosystem-based forest management that are suitable for the Georgian context. Teams will be comprised of primarily seasonal staff.
- **Cutting operations/ harvesting teams:** 4-5 per region (13 in total), with 3 staff per team. Equipment needed includes additional chainsaws and tools, forest skidder, cable and crane system, off-road cars, tree felling level, felling wedge and felling axe. Teams will need to be trained on low-impact harvesting practices. NFA will also have the responsibility to organize and supervise private sector activities for harvesting (e.g. selecting trees that should be cut, marking them and supervising the work of private sector contractors).
- **Transportation teams:** 3-4 per region (10 teams in total), with 3 staff per team. Equipment needed includes off-road trucks, logging trucks, and GPS monitoring systems installed in trucks. Teams will need to be trained on standard operating procedures, and protocols pertinent to timber transport between forests and business service yards (where timber is registered, sorted, dried and stored).
- **Forest access road and skidding trails building and maintenance teams:** 2-3 per region (7 teams in total), with 3 staff per team. Equipment needed includes builders' levels, excavators, and trucks (per team). At the regional level there is the need to purchase 1 grader, 1 bulldozer and 1 road rollers per region. Teams will need to be trained on low impact and resilient forest infrastructure development, based on international best practices that are suitable for the Georgian context (considering Georgia's mountainous terrain). NFA will further be responsible for organizing and supervising private sector teams for forest road construction.

The following Table summarizes the number of staff and equipment costs for the new NFA staff concept for the project area (8 districts in 3 regions).

Table 42: Number of staff for specialized NFA teams within the eight target districts, and the cost for equipping each team

Measures	Number of teams (#)	Number of staff (#)
Restoration: Natural regeneration	46	368
Restoration: Enrichment planting	8	60
Seasonal worker for restoration (total)	54	428
Cutting Operations: Tending, Thinning and final harvest	13	39
Timber transport	10	30
Forest roads & skidding roads	7	21
Forest road maintenance		
Forest workers (total)	30	90
Total	-	518

The above described structure is a departure from current management practices, and will take time to find new staff, procure equipment and build capacities. Currently NFA in the project region (covering 14 districts) has 3 chief foresters, 3 forest operation managers, and 33 forest work specialists.

Furthermore, forest roads are in poor quality and limited in quantity that greatly limit the adoption of SFM. Thus, initial investments in resilient forest infrastructure (incl. roads) is a top priority to facilitate the adoption of SFM in Georgia's forests. To do so requires not only training NFA and private sector on low-impact and resilient forest infrastructure development for ecosystem-based forest management, but also ensuring additional support to NFA to support the planning of new roads (e.g. civil engineers) to ensure low impact and resilient construction, planning and maintenance. Improving the forest access road network will also require the capacity building and training of DES early on to ensure sufficient forest supervision and law enforcement in newly opened areas.

Despite the need for up-front investments in equipment, infrastructure and staff, Government budgets are unable to fully cover all of these up-front costs. See Chapter 5.2.4 for more detailed information on the financial barriers for scaling up SFM.

Info Box 16: University and vocational education and training

Once the forest code is approved, Georgia will need to build up/ strengthen institutions, such as Forestry Colleges, to ensure that there are sufficient vocational education facilities and programs to accommodate training programs for new and existing staff to meet the formal qualification requirements established in the new forest code. This will include working with both University and Forestry colleges to make sure there are i) sufficient programs available for foresters and forest workers to receive formal qualifications (considering existing employees, and future employees), ii) that programs have sufficient equipment and resources for trainings (enabling in-class and in-forest trainings), and ii) that the programs are of sufficient quality and reflect the forest sector reform and associated regulatory changes. Best practices for SFM, in particular

ecosystem-based forest management, that are appropriate for the Georgian context should be mainstreamed into courses.

In addition to strengthening vocational education for future and existing staff to meet the requirements laid out in the new forest code, forest sector training should be improved to strengthen continuous learning, and improved knowledge management. Trainings are often limited to one-off trainings, and there is a need to institutionalize key trainings. It is recommended that a knowledge management and learning platform is established, involving an online information management system combined with e-learning courses, in-classroom and in-forest trainings. Such a system can include videos from trainings in the field, improve documentation and knowledge management, and improve knowledge transfer and information dissemination within forest sector organizations. To support such a system training modules should be developed, including guides for training trainers, which facilitate trainings to be conducted various times, and to be followed-up using training pools within forest sector institutions. However, given limited budgets and capacities – additional technical support is required.

Info Box 17: GIZ's Support on Vocational Education and Training in Georgia

In the frame of the strategic concept for improving the forest education and vocational training situation in Georgia within a mid- and long-term horizon, support was given to the NFA to develop the vocational education course “Forest Work Specialist”⁴¹³ which got accreditation from the MoES and program started in 4 VET colleges (Kakheti, Samtskhe-Javakheti, Adjara, Mtskheta-Mtianeti) in 2017. All 4 colleges passed through the authorization with support of GIZ by providing the necessary equipment for practical work. Chainsaw training was also conducted how to use handed over chainsaws properly and safely.

Training of Trainers on “Pedagogic issues for VET education teachers” was conducted for VET teachers and after words study tour to Bavaria was organized for NFA and VET teachers and directors to learn about VET education in Bavaria. Further support of VET colleges is ongoing and by the end of IBiS work a training on safety will be organized. Further support in amending and improving the modules for vocational education program and elaborating new modules for short courses (mainly on forest operation) is also foreseen by the end of IBiS.

Private sector

Different private sector actors will be affected differently by forest sector reforms. The forest sector reform holds substantial potential for private sector companies to develop their businesses, and build up capacities. NFA acknowledges the important role of the private sector to meet the ambitious targets for sector reform.

Considering 70% of management activities (including the same activities and similar team structures for NFA – cutting operations, low impact and resilience forest infrastructure construction and maintenance, and transportation)⁴¹⁴ are expected to be conducted by the private sector,

⁴¹³ While the forest code uses the term “Forest Worker”, the term “Forest Work Specialist” has been used in vocational education and training programs, and has even been accredited by the Ministry of Education. This is due to the fact that the term “worker” in the Georgian language has more negative connotations, and the term “forest work specialist” was thus selected to make the profession more attractive. The terms nonetheless refer to the same position, and are often used interchangeably.

⁴¹⁴ Note: NFA envisions hiring seasonal staff to support with general forest maintenance and restoration activities, which is why NFA's staff numbers seem high in comparison to the private sector.

private sector contractors/ service providers will also need to invest in additional staff and equipment. Based on the forest model, annual tendering volumes for private sector companies for the 8 districts are expected to surpass GEL 35 million, and create 250 jobs. With plans to continue to scale up SFM in the future (within the other 6 districts in the target regions, and other regions), private companies will have substantial potential to grow to meet the demand for skilled forest contractors.

However, private sector service providers currently do not have the adequate experience and skills of low impact logging and do not possess knowledge about safety standards, ecosystem-based forest management practices, nor adequate equipment.⁴¹⁵ Currently private sector service companies have an investment backlog, often using old and unsuitable equipment/ machinery that is not suitable for SFM, especially ecosystem-based forest management (often causing unnecessary negative environmental impacts, and posing an occupational health and safety risk).⁴¹⁶ The following Table summarizes the anticipated private sector investment needs to implement low-impact logging, timber transport and road construction in the 8 districts, considering the BAU use of old and unsuitable equipment.

Table 43: Number of staff for specialized private sector contractor teams within the eight target districts, and the cost for equipping each team

Measures	Number of teams (#)	Number of staff (#)
Cutting Operations: Tending, Thinning and final harvest	33	98
Timber transport	33	98
Road building	24	72
Total	-	270

Private sector contractors further have limited capacities on ecosystem-based forest management. Trainings on best practices to operationalize SFM, in particular ecosystem-based forest management, are required to facilitate the adoption of SFM at scale.

Key barriers that limit the private sector from investing in SFM (including investments in improved equipment, practices/ trainings, and increasing staff, among others):

- **Unattractive investment climate for private sector contractors:** The investment climate for private sector service providers based on current conditions is not appealing, for various reasons:
 - **Lack of awareness:** Private sector actors expressed uncertainty of the role of the private sector under the forest sector reform. While it is envisioned that they conduct 70% of management activities, there is a need to conduct further awareness

⁴¹⁵ Detailed analysis available in Forest Model Excel file.

⁴¹⁶ Exceptions are production groups, associated with large-scale license holders, which usually have better equipment.

raising for private sector actors on opportunities for them under the forest management system overseen by NFA.

- **Short contracts limit medium-term investments in equipment and staff:** Contracts are up to 1 season under procurement law, which creates uncertainty for private sector companies and does not provide sufficient incentives to invest in staff, training or improved equipment. During the project design phase this was discussed, and NFA is following up to adjust contracting times to make a more attractive investment climate for private sector actors.
- **Inability to access credit:** Private sectors are unable to access suitable finance for modern equipment. Financial instruments that enable private sector actors to access finance to invest in improved equipment for SFM, in particular ecosystem-based forest management, are needed. However, private sectors not applying for credit is also linked to the previously mentioned points, which limit the confidence of private sector actors to invest – due to uncertainty regarding their investments in the medium and long-term.

Consequently, private sector actors are very reluctant to invest given these current barriers. However, interviewed actors noted that if management contracts could be given on a longer-basis (not just 1 season), and if the volume of contracts were to increase then it could provide incentives for them to invest in strengthening capacities and improving equipment. While the model demonstrates that the volume of contracts will increase substantially, it is nonetheless recommended to develop further targeted incentives to build the private sector's confidence in investing in the sector (e.g. providing them with trainings to enabling the quick early adoption of SFM, developing financial instruments, and changing contract lengths).

Results from the forest model

Ultimately the adoption of the model will result in the sustainable management of 270,807 ha of forests, with active interventions on ~157,359 ha.

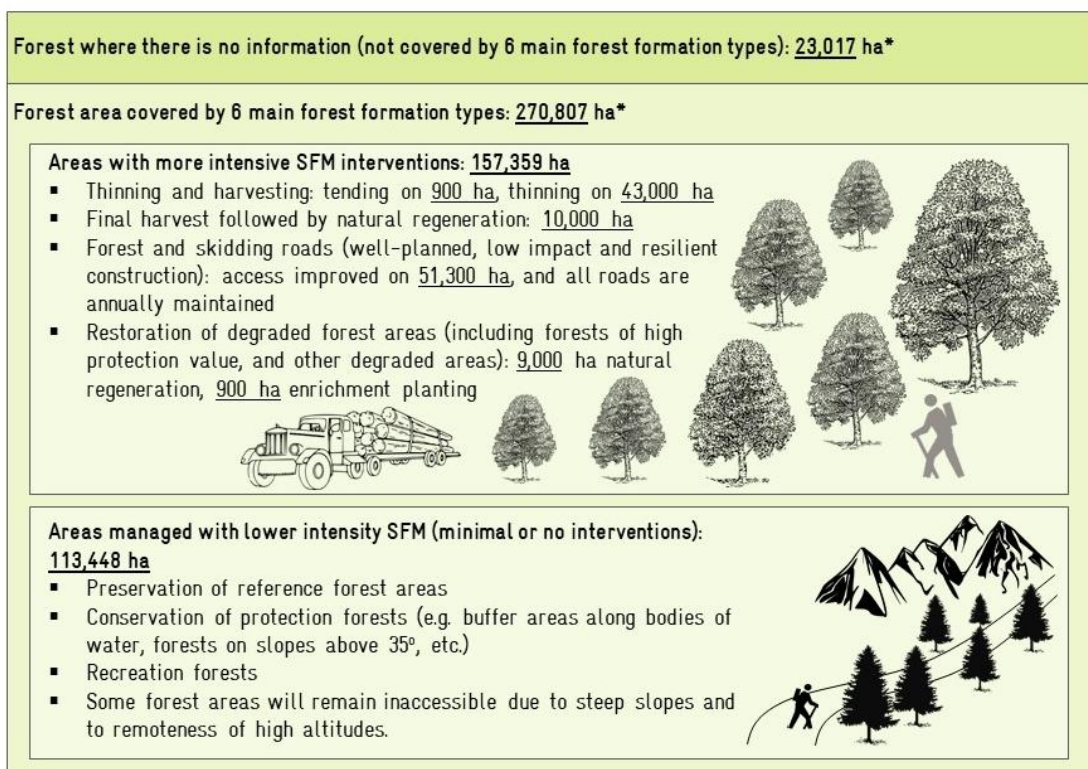


Figure 57: Overview of planned activities

The following figures represent key results from the forest model, and include benchmarks comparing these figures with best practices for SFM in the European Union.⁴¹⁷

*Table 44: Comparison of BAU and SFM conditions in Georgia, benchmarking with SFM in EU countries***

	Georgia / 8 districts		EU 28 (SFM) ⁴¹⁸
	BAU	SFM	
Forest road density	3 m/ha	16 m/ha	<p>Target Values in Central and Eastern Europe: ⁴¹⁹</p> <ul style="list-style-type: none"> ▪ Boreal areas 10.00 m/ha; ▪ Easy terrain in central Europe: 22.00 m/ha; ▪ Easy terrain eastern Europe: 15.00 m/ha; ▪ High productivity mountainous regions: 30.00 m/ha;

⁴¹⁷ Benchmarking is based on an unpublished study from 2010 comparing forestry practices in 28 EU countries.

⁴¹⁸ See above.

⁴¹⁹ EC Directorate General for Energy (2016): Maximising the yield of biomass from residues of agricultural crops and biomass from forestry. <https://ec.europa.eu/energy/en/studies/maximising-yield-biomass-residues-agricultural-crops-and-biomass-forestry>.

	Georgia / 8 districts		EU 28 (SFM) ⁴¹⁸
	BAU	SFM	
			Alpine regions- Low productive and mainly steep areas: 15.00 m/ha
Skidding road density	9 m/ha	47 m/ha	Not available
Restoration: Reforestation by enrichment planting	~0.67 ha/ year (3.4 ha over 5 years) ⁴²⁰	~126 ha/yr (0.05%/yr, or 890 ha over 7 years)	EU28: 0.26%/yr Austria: 0.06%/yr France: 0.5%/yr Germany: 0.06%/yr
Restoration: Reforestation by-natural regeneration	Support for natural re-generation supported on ~3.6 ha/year (18.2 ha over 5 years) ⁴²¹	~1,286ha/yr (0.48% per year, 9,000 ha over 7 years)	EU28: 0.14%/yr Austria: 0.6%/yr France: 0.14%/yr Germany: 0.36%/yr
Regeneration after final harvest	N/A	1,400 ha/yr (0.53% per year or 10,000 ha over 7 years)	Note: Natural regeneration cannot be given separately for restoration and regeneration after final harvest)
Wood volume	148 m ³	192 m ³ (after 20 years) 168m ³ (after 7 years)	EU28 ⁴²² : 174 m ³ /ha; Austria: 321 m ³ /ha; France: 175 m ³ /ha; Germany: 343 m ³ /ha
Wood increment⁴²³	2.7 m ³ /ha/year	3.5 ⁴²⁴ m ³ /ha/year	EU28 6.3m ³ /ha/year; Austria:9.3 m ³ /ha/year; France: 7.2 m ³ /ha/year; Germany: 11.1 m ³ /ha/year
Sustainable yield*	0.35 m ³ /ha/year	2.1 m ³ /ha/year, equivalent to 79% of increment, and 14% of the volume	Equivalent to 81% of increment, and 23% of volume; EU28: 4.0 m ³ /ha/year; Austria: 8.1 m ³ /ha/year; France: 3.9

⁴²⁰ NFA Regional Profile provided for project development.

⁴²¹ Ibid.

⁴²² Data for Volume, increment and yield: EFISCEN Model database for 2010 („Model documentation for the European Forest Information Scenario model (EFISCEN 3.1.3)“. 2015.(03/2019). <http://www.efi.int/files/attachments/publications/alterrarapport1559.pdf>).

⁴²³ Georgian Yield Tables (Mirzashvili and Kufaradze, 1955).

⁴²⁴ 3.5 m³/ha/year have been calculated based on the assumption of the Forest Model after 20 years of implementation of SFM

	Georgia / 8 districts		EU 28 (SFM) ⁴¹⁸
	BAU	SFM	
			m ³ /ha/year; Germany: 6.8 m ³ /ha/year
Annual fuelwood production in target districts	85,362 m ³ /year legally harvested ⁴²⁵ Demand: 381,643 ⁴²⁶	285,575 m ³ / year	Not applicable

**Balanced between optimal sequestration and high fuelwood demand*

***See Chapter 11 for a more detailed description of the risks. Due to the lack of forest inventories and information, there is a risk that forest conditions may require adjustments in the planned SFM interventions.*

Forest access roads, tending and harvesting

Forest access roads will be built (based on detailed planning, and using low-impact and resilient construction practices) covering 641km, and skidding roads covering 1,924 km. Annual maintenance will be conducted on all skidding roads and forest access roads to limit potential environmental impacts, and ensure that the roads condition are maintained. Investments in the road network will improve access mainly to the actively managed 157,358 ha of forests within the eight target districts. SFM will result in the creation of ca. 9,000 ha of new forests from restoration via natural regeneration, plus an additional 900 ha from enrichment planting (using native species). Tending will occur on approximately 880 ha in stands in the thickets and young pole phase, so up to 20 years of age, and thinning on 43,000 ha in older stands between age 20 and 120 years, supporting improved tree species composition, forest quality and growth. Such practices will further enable improved resilience to climate change in healthy forest ecosystems, including through the promotion of native and site-adapted species, and natural forest conditions and improving planning for climate change adaptation (although for the latter, the lack of detailed climate risk assessments in forest ecosystems is a barrier).

At full capacity (by year 7), an estimated 484,548 m³ per year could be sustainably harvested in the targeted districts (including 285,575 m³ of fuelwood per year; see Figure 58, Figure 59, and Table 45 below). Harvesting will be conducted using low-impact logging practices that limit the impact of harvesting on the environment, as well as appropriate safety practices and equipment to limit occupational health and safety risk for forest workers.

⁴²⁵ Scaled down from 2018 NFA data in the three target regions.

⁴²⁶ CENN 2016.

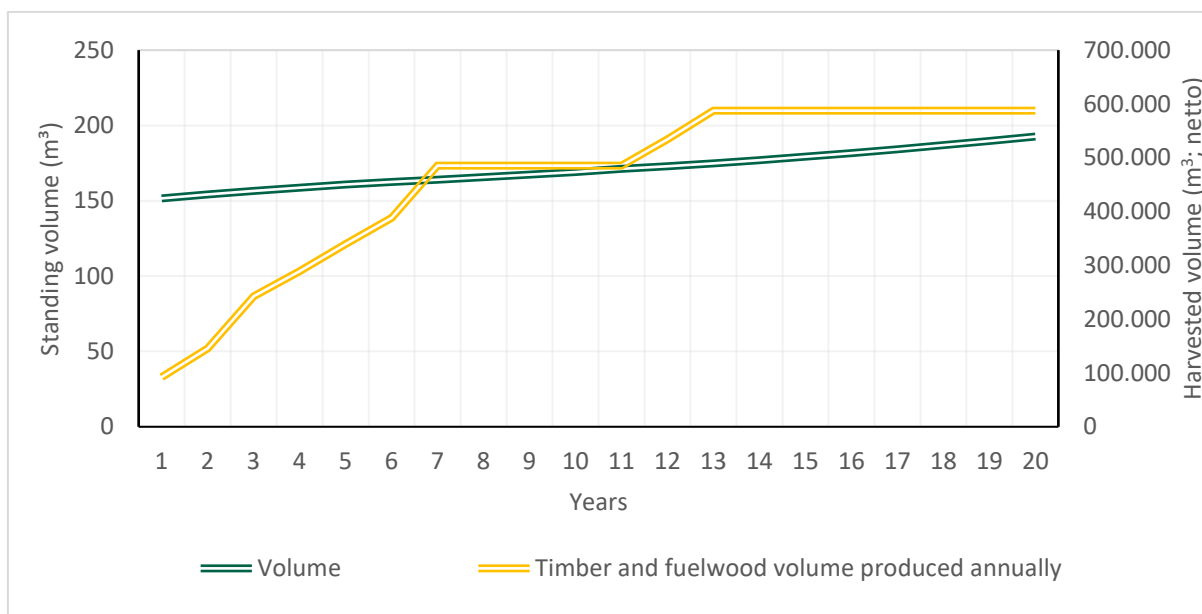


Figure 58: Overview of expected increase in standing volume (m³), and the volume of timber and fuelwood produced annually (m³)

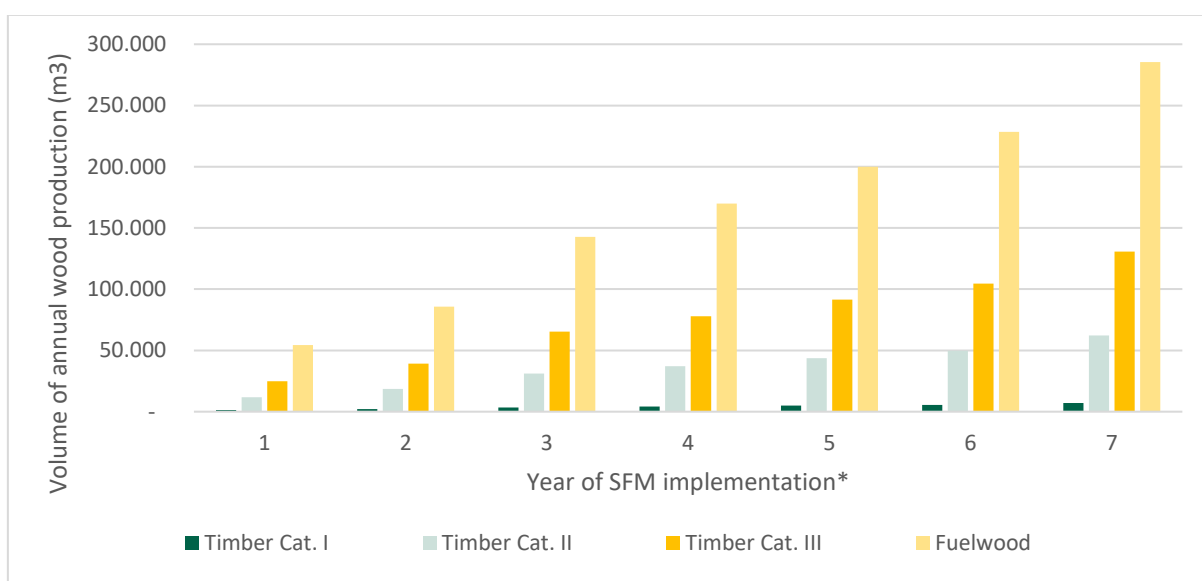


Figure 59: Overview of wood (category I-III timber, and fuelwood) production potential over 7 years considering gradual implementation of SFM in the eight project districts
*considering "full capacity" for SFM reached in year 7

Table 45: Potential harvest of category I, II, III and wood based on SFM under the forest model*

	Category I		Category II		Category III		fuelwood	
	Volume (m³)	Value (EUR)	Volume (m³)	Value (EUR)	Volume (m³)	Value (EUR)	Volume (m³)	Value (EUR)
26,173	2,010,707	194,948	12,123,362	369,926	18,371,395	1,056,708	18,371,395	26,173

2,475	613,868	59,243	13,166,298	164,125	32,562,992	109,864	32,562,992	2,475
28,648	2,624,576	254,191	25,289,660	534,051	50,934,387	1,166,572	50,934,387	28,648

*Please refer to the forest model excel spreadsheet for a detailed list of assumptions and more detailed information on the estimations

The barriers for implementing the SFM model are particularly linked to finance and capacities, and are described in detail in Chapter 5.2.4.

The integrated approach of an ecosystem based “close-to-nature” Sustainable Forest Management

The new management represents an important stepping stone in Georgia to set a good example of best practice forest management planning processes, promoting ecosystem based “close-to-nature” SFM, and strengthening to role of biodiversity conservation and monitoring on the entire NFA-managed forest land.

SFM promotes forest conservation, based on suitable zoning and planning in FMPs. FMPs will include detailed zoning of ecosystem services or forest functions, understanding the multiple uses of forests. Detailed Management-level Criteria and Indicators for Ecosystem-based Forest Management (described in the Chapter 5.2), will inform the revision of key regulations for forest management, which will then be integrated into FMPs and the operationalization of SFM. These criteria strongly emphasize the importance of ensuring a close-to-nature forest development and enhancing the protective function of forests.

In terms of SFM activities, the following management activities will promote forest restoration:

- Preservation of unmanaged reference forest areas to allow the analysis of natural dynamics and to derive data on the natural potential forest types – 10% of forest land;
- Adapted management considering the prioritized set of forest function /ecosystem services at each forest stand based on the natural dynamics of the prevailing natural forest type;
- Management according to natural forest types considers climatic, soil and terrain conditions, and the “typical” biodiversity of those forest types;
- Relying and promoting natural regeneration, on the basis of ecological relevance, taking into account the natural and climatic conditions of the area and the tree species composition of the natural forest type of the particular area;
- Restoration of degraded forest areas (including forests of high protection value) with the aim to support the growth of natural forest types;
- Restoration and maintenance of areas with high protection value (e.g. along river banks, in buffer zones, in steep areas, Emerald sites);
- Conservation of protection forests, and where necessary management to enhance protection and protective forest functions (e.g. buffer areas along bodies of water, forests on slopes above 35°)
- Zoning in FMPs to promote but control recreational use;
- Participatory approach in FMP development will ensure that important protective forest functions for neighbouring communities are identified;
- Conversion of forests that do not match with the natural forest types (i.e. forests with a majority of non-native and/or non-site adapted tree species). They shall be converted towards the natural potential forest types considering natural succession processes; and
- Establishment of regulations and building capacities will ensure reduced disturbance management operations.

The implementation of well-planned measures will profit from best practice and modern intervention techniques and harvesting techniques. SFM will profit from a network of access roads

as a precondition for a sustainable forest management, planned systematically during FMP, and built considering the forest landscape using suitable techniques to ensure low-impact and resilient construction. These access roads will also be regularly maintained to avoid erosion and destruction, whilst ensuring accessibility to enable SFM.

The development and operationalization of FIMS will also improve biodiversity and conservation planning, management and monitoring based on up-to-date forest management inventories and plans. This not only improves the monitoring capacities and capabilities of the government and other FIMS users, but also will strengthen knowledge and information management and dissemination on biodiversity and forests in Georgia.

Info Box 18: Potential to strengthen the emerald network through project interventions

While existing Emerald sites in Guria and Mtskheta-Mtianeti are primarily located in protected areas (65% of existing emerald sites; see Chapters 1.3 and 1.4), it is not required that Emerald Sites are within formal protected areas. To become an Emerald Sites, the proposed sites must meet at least one of the following criteria:

- Ensure protection of endangered (including migratory) species
- Be characterized by high biological diversity
- Comprise (currently or in the past) the fauna and flora habitat types defined under Bern Convention or their fragments⁴²⁷
- Have special importance for migratory species and/or for the fulfilment of Bern Conventions.

While majority of approved Emerald Sites in the project regions are located within protected areas, there are proposed sites (soon to be added to the list of official 'candidate sites') that are located on NFA-managed land. In particular, within Kakheti there are four sites proposed, on NFA land (3 of which are forested).⁴²⁸

Emerald sites provide differentiated levels of protection, and do in general not prohibit economic activities and use, although this depends on the status and condition of the resources as it is key that the habitat is kept in favorable conservation state, as outlined in the corresponding Emerald Site Management Plan. In Georgia, the planning and management of Emerald sites is integrated in FMPs. Based on FMIs and FMPs, key areas for biodiversity protection can be flagged, which can be managed through the FMP to with a focus on protection and/or conservation, and could even be flagged as a future Emerald site

5.2.3.5 Fuelwood and timber supply

Phasing out the social wood programme by January 1, 2022,⁴²⁹ along with foreseen strengthened law enforcement to combat illegal logging (Activity 1.2), will support the transition to a new fuelwood provision mechanism overseen by the NFA. It aims to provide fuelwood to local households, commercial and public users based on harvests within sustainable removal limits. While there is a need in Georgia to '*phase down fuelwood consumption*' through the promotion

⁴²⁷ <https://www.coe.int/en/web/conventions/full-list/-/conventions/treaty/104>

⁴²⁸ : Alazani (GE0000022), Gombori (GE0000027), Kvareli-Shilda (GE0000029), Kotsakhura (GE0000029) and Kistauri (GE0000055). Out of these 4 sites only 3 (Alazani, Gombori and Kvareli-Shilda) are covered by forest. A vast portion of the Kotsakhura site is not covered by forest.

⁴²⁹ Draft Forest Code, Version submitted to Georgian Parliament in February 2019.

of energy efficiency and alternative fuels, as described in the previous chapter, the production of fuelwood must be simultaneously ensured from sustainably managed forests.

In addition, forest licenses have not been issued since 2012, and the last licenses are set to expire in 2028. Commercial timber will thus transition from private sector licenses/ concessions to a new system where commercial timber is sustainably harvested and sold by NFA.

Under the new forest code, NFA will be responsible for the provision of legally and sustainably sourced fuelwood and commercial timber in the country from NFA-managed forest land.⁴³⁰ A concept for the new fuelwood and timber provision mechanism under the NFA has been drafted by the Government (see Figure below). The mechanism is as follows:

1. Timber and fuelwood will be sustainably harvested from NFA forest land. SFM, in particular ecosystem-based forest management, will be implemented based on new Forest Management Plans and annual plans aligned with the new forest code, and updated regulations/ secondary legal acts, which also set the sustainable level of fuelwood and timber to be removed.
2. Once harvested and transported to forest roads, harvested wood will be placed in registered wood trucks, containing installed GPS trackers to ensure that wood can be traced from the forest to business service yards (see step 3).
3. The wood will arrive at 'business service yards', newly constructed centers where wood will be sorted into four qualities of timber, chopped (if necessary), and stored and fuelwood air dried. Timber will be sorted into four qualities of wood, which will reflect their prices. Only category IV, and if necessary, category III timber will be used for fuelwood. Each business service yard will contain the following infrastructure (Figure 61):
 - Concrete re-enforced fence: To limit entry into the yard and prevent theft.
 - Office and entrance gate: Support registration of timber trucks and serve as the administrative center for the business yard. In some instances, the sites selected for BSY development have existing office buildings (although often renovations are required), while in other cases office buildings need to be constructed from scratch.
 - Covered shed for wood storage and manipulation: A covered area is needed for the drying and storage of harvested wood, prior to sale. Also, preliminary wood manipulation can occur under the sheds if necessary (e.g. chopping of fuelwood).
 - Equipment: freight tractor, trailer with a crane for roundwood manipulation, trailer for fuelwood manipulation, semi-automatic chopper, and a loading tractor.
4. Wood registered and stored at BSYs will be marketed and sold to private businesses, and local people. Understanding that the location of BSYs may be a limitation for local people to access fuelwood, a delivery service will be established where it can be transported for a fee to municipalities, businesses and local people. For the delivery service an average transport distance of 15-25 km was considered, resulting in costs of ca. 9 GEL/m³.

⁴³⁰ Draft Forest Code, Version submitted to Georgian Parliament in February 2019.

- The earnings from BSYs, in particular the sale of commercial timber and fuelwood, will be reinvested into the NFA, supporting them to reinvest in the sustainable management of the country's forest resources.

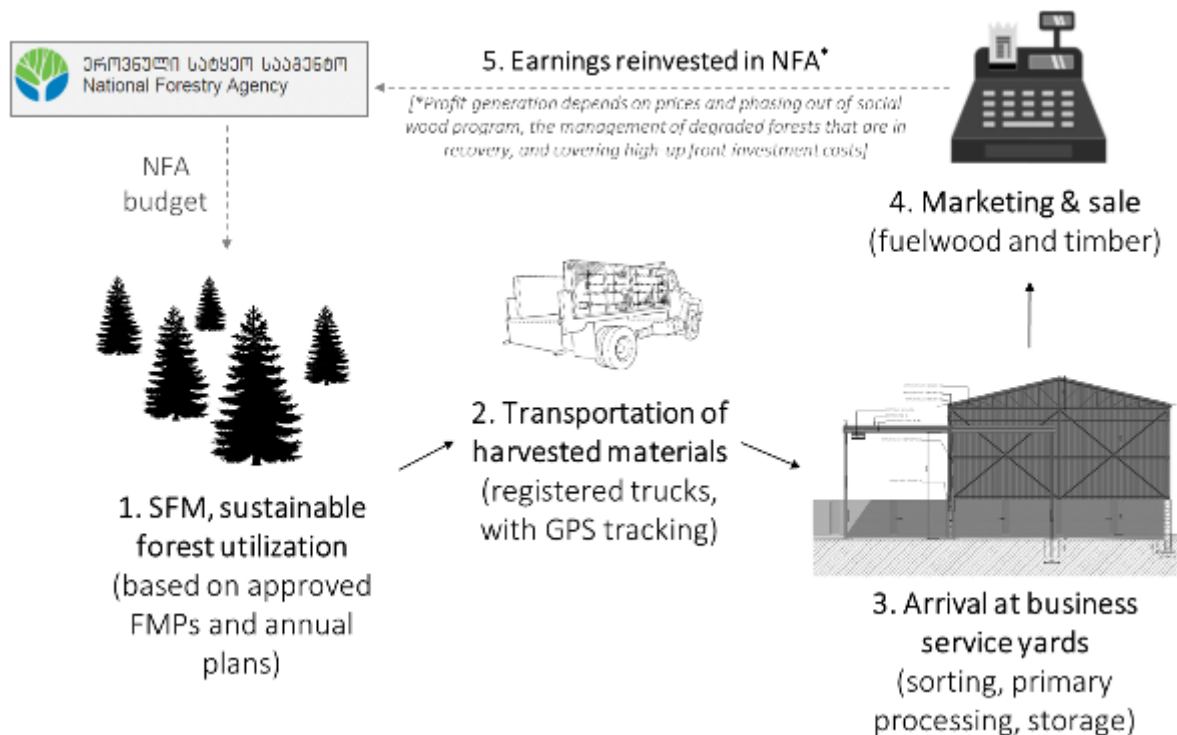


Figure 60: Overview of NFA's concept for providing sustainably sourced timber and fuelwood

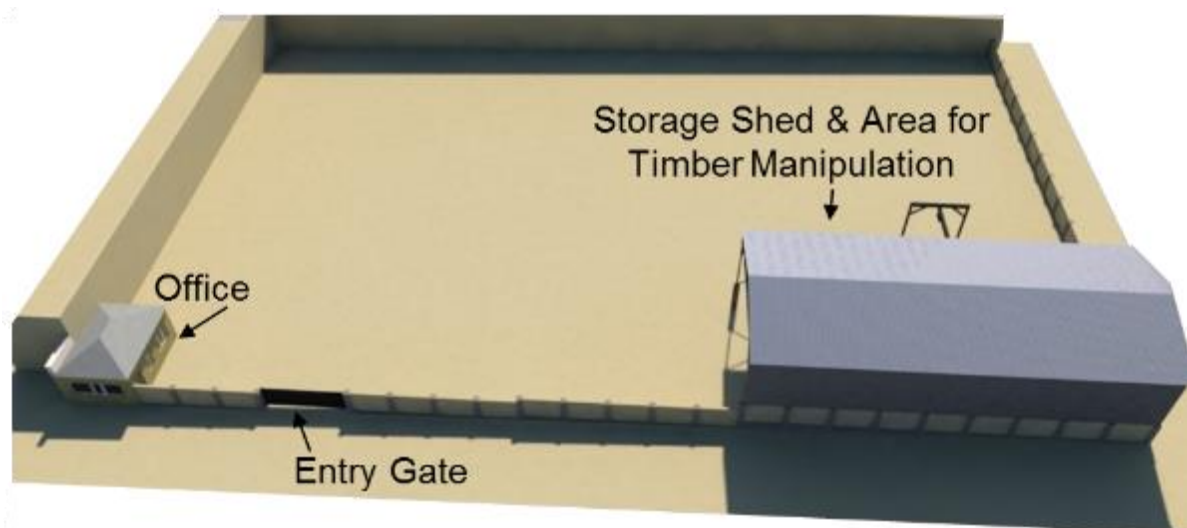


Figure 61: Potential BSY layout and overview of key infrastructure

Source: Drafted for GIZ to support the construction of the first BSY, to be established in Akhmeta District in 2019

Advantages of the proposed concept

The proposed concept will increase revenues from the sustainable harvesting of timber and fuelwood by:

- Resulting in less damage due to appropriate storage, and wood manipulation in controlled yards.
- Improving legality and timber control/ traceability, through transporting wood with registered trucks, and registering and sorting the harvested wood in secure yards.
- Improving sorting processes – where measurements, sorting and recording can be conducted with greater accuracy, enabling NFA to earn more revenue from the sale of sorted higher quality timber (instead of using higher quality timber for fuelwood).
- It will further improve energy efficiency through promoting the use of dried fuelwood, instead of humid/damp and less energetically efficient fuelwood that is currently often used.

Barriers for the construction, operation and maintenance of BSYs

- **Inadequate finance:** Originally NFA planned to establish 54 business yards in 2019 for the entire country, however due to budget limitations this was not possible. Originally, NFA budgeted around GEL 40,000 per BSY (EUR 13,500) when they made the request to the Ministry of Finance. However, the actual costs are much higher (see
- Table 46). Within the project region it was determined that a total of 15 BSYs are needed to support the initial rollout of SFM. GIZ is supporting the Government to construct the first BSY in Akhmeta District, where the design specifics and detailed costs have been elaborated in detail (Appendix 4 provides more detailed specifics). Akhmeta's BSY will serve as a model example for the rest of the country. However, NFA does not have sufficient funds to establish all 15 required BSYs, and the corresponding equipment.

Table 46: Costs per BSY

Item	Cost	
	GEL	EUR**
BSY Design and Construction	178,800 per BSY	60,000 per BSY
BSY Equipment (transportation fuelwood manipulation, tractors, loading tractors, and fuelwood choppers)	891,000 per BSY	298,994 per BSY
Staff costs (5 workers, 1 manager per BSY)	276,000 per BSY/ year	92,618 per BSY/ year
Average* O&M Costs (Not including staff)	1,527,008 – 2,490,080 per BSY/ year	512,419 – 835,598 per BSY/ year
Average* O&M Costs (Including staff)	1,803,008 – 2,766,080 per BSY/ year	605,037 – 928,215 per BSY/ year

*Note: O&M costs differ over time, including needed re-investments in equipment. Detailed calculations and yearly estimates are included within the financial and economic analysis excel file.

**Exchange rate of EUR 1 to GEL 2.98

- **Lack of standard operating procedures, protocols and guidelines for BSY operation:** Since the fuelwood provision mechanism is new – there are no standard operating procedures, guidelines, or training modules for BSYs. Such procedures and supporting materials are necessary to support the scaling up of BSYs across the country to ensure safe working practices, consistent standards, transparent management, and effective timber tracking.

- **Limited staff capacities:** An additional barrier is that NFA has limited capacities on marketing timber and fuelwood, as well as economic planning and modeling for ecosystem-based forest management – in particular ensuring that FMPs are linked to annual plans and longer-term business plans. Training support is needed for NFA on business plan development (linking FMPs and BSY operation), timber and fuelwood marketing at both the regional level and national level.
- **Reservations held by local population:** A barrier for the adoption of this new mechanism will be related to its reception by the local population. While some preliminary awareness raising has been conducted in the framework of the forest code and NFP, many local communities are unaware of what the new fuelwood and timber mechanism will look like under NFA. There is a need for public information campaigns and awareness raising related to the forest sector reforms, in particular the mechanism for fuelwood provision to build up local support and awareness of the benefits of SFM, in particular ecosystem-based forest management, and the new system (incl. implications in terms of costs, access points, and regulations).

5.2.4 Key challenges for implementation of the forest reform

5.2.4.1 Summary of barriers addressed by the reform and outstanding challenges

The country's forest sector reform aims to address the key barriers faced by the forest sector, as identified in the Figure below:



Figure 62: Overview of barriers to SFM

Nonetheless, there are still outstanding barriers and challenges that could limit the adoption of the reform, as highlighted in the following table:

Table 47: Barriers addressed by the forest sector reform and outstanding challenges and barriers

Barrier	How Forest Reform Addresses It	Outstanding Barriers/ Challenges
Current forest utilization practices have led to over-harvesting of forest resources	<ul style="list-style-type: none"> ▪ New forest code drafted and undergoing parliamentary hearings ▪ Regulations to be revised based on ecosystem-based forest management (see row below) ▪ Foresters and forest workers to require official qualification to work in the sector (after 2025) ▪ Improving forest education and awareness raising ▪ Strengthening stakeholder consultation in FMP development ▪ FMPs to be required for all forest districts 	<ul style="list-style-type: none"> ▪ Capacity gaps related to financial and economic planning (need business plans to link FMPs with marketing plans and operation of BSYs) ▪ Financial gap for implementing FMP development in all districts ▪ Financial gap for the implementation of SFM (see sub-chapter below) ▪ Capacity gaps: At least 270 private sector contractors required to implement SFM, along with 90 permanent NFA staff and 428 NFA seasonal forest workers ▪ Insufficient cross-sectoral coordination has limited the development of joint initiatives to tackle cross-cutting topics such as fuelwood, energy efficiency, alternative fuels and rural development, among others ▪ High rural demand for fuelwood (see row on the Social Wood Program below) ▪ Limited capacities in MoEPA to review FMPs to ensure SFM is effectively planned, implemented and monitored
Operational and legal restrictions limit the ability to benefit from SFM, in particular ecosystem-based forest management	<ul style="list-style-type: none"> ▪ New forest code drafted and undergoing parliamentary hearings ▪ Once the forest code is approved, key regulations will be revised based on National Principles Criteria and Indicators for SFM, and Management-level Criteria and Indicators for Ecosystem-based Forest Management ▪ Support committed for the revision of regulations 179, 241 and 242 from GIZ 	<ul style="list-style-type: none"> ▪ Financial and technical support required to enable regulatory revisions over time (additional revisions may be needed to adapt regulations based on early experiences) ▪ Collection of non-timber forest resources is only permitted for personal use, whereas the commercial use of non-timber forest resources is currently not regulated ▪ Insufficient awareness of reforms at the local level, combined with environmental education and awareness of sustainable forest management and use. ▪ Insufficient cross-sectoral coordination and joint cross-sectoral initiatives
Inadequate forest supervision	<ul style="list-style-type: none"> ▪ Transferring responsibilities from NFA to DES (already ongoing since 2019) ▪ Electronic System of Timber Resources improves transparency and traceability along wood value chains 	<ul style="list-style-type: none"> ▪ Vehicles are insufficient and often in poor condition, limiting access to investigate forest incidences ▪ Inadequate finance to invest in equipment for new staff ▪ Lack of a standardized training system results in a variety of trainings (in terms of topics and quality of trainings), especially at the sub-national level. Lack of standard training modules on international and national best practices, which ultimately contributes to limited staff capacities.

Barrier	How Forest Reform Addresses It	Outstanding Barriers/ Challenges
	<ul style="list-style-type: none"> ▪ Phasing out concession system and social wood program, and transitioning to a NFA-managed mechanism (see below) ▪ FIMS modules developed and will improve monitoring and transparency in the sector ▪ Plans to increase staff size 	<ul style="list-style-type: none"> ▪ Weak capacities of staff on various topics related to improved forest supervision incl. knowledge on best practices for patrolling and inspection ▪ State budget only covers basic equipment (uniforms, radio communication, etc.),⁴³¹ and there are insufficient resources to invest in additional technology that would greatly improve forest supervision (incl. cameras on forest roads, drones for detection of illegal activities, etc.). Such technology will improve the monitoring of forests and potential hotspots of illegal activity, improved control of forest roads and transportation of timber. ▪ Gap in Electronic System of Timber Resources Management with the Revenue Services System that inhibits timber tracking from sawmills
Inadequate forest management practices and weak forest management capacities	<ul style="list-style-type: none"> ▪ New forest code and revised regulations will create a regulatory framework that enables the adoption of SFM, in particular ecosystem-based forest management ▪ New FMP planning processes will ensure that forest management is based on existing forest conditions and priorities, and will further consider consultations and improved cooperation with local communities (e.g. on grazing and other topics) 	<ul style="list-style-type: none"> ▪ Insufficient forest infrastructure (especially access roads and skidding trails), limits the rate at which SFM can be adopted it is a pre-condition for SFM. ▪ Limited capacities on SFM, especially low-impact ecosystem-based practices (everything from low-impact and resilient forest infrastructure planning and construction, low impact cutting operations, restoration, among others). ▪ Limited capacities are further limited by the lack of an institutionalized platform/system for knowledge management and trainings. Trainings are often limited to “one-off” trainings, which limits capacity development ▪ “Official qualifications” that foresters and forest workers must meet are not yet clarified. ▪ VET schools need additional financial and technical support to accredit new programs based on best practices for SFM, in particular ecosystem-based forest management that are suited Georgia’s context. ▪ Insufficient Staff. NFA needs to hire at least 428 seasonal workers, and 90 forest workers (an increase from the existing 30 workers in the project target regions). In addition, at least 270 private sector contractors are

⁴³¹ List provided by DES highlighted that majority of their budget was dedicated to staff costs, as well as the purchase of uniforms, flashlights, truncheons, rescue vests, fire extinguishers, vehicles, flasher lights, among other standard equipment. DES’s Budget also covers laboratory surveys, office expenses, fuel and maintenance expenses of fleet of cars, vehicle and (partial) personnel insurance costs, and the construction of an office building in Kutaisi,

Barrier	How Forest Reform Addresses It	Outstanding Barriers/ Challenges
		<p>needed to implement SFM in the target districts. This requires not only paying salaries (see financial barrier below), but also ensuring they are trained to implement best practices for ecosystem-based forest management.</p> <ul style="list-style-type: none"> Local communities do not have sufficient capacities to understand the FMP process, nor opportunities for them to negotiate (e.g. grazing conditions, input on forest function mapping, etc.). Insufficient information on climate risks and vulnerability of forest ecosystems in the project's regions, limits adaptive planning
Inefficient social wood program and concession system	<ul style="list-style-type: none"> Both are being phased out (social wood program by 2022, and concession system by 2028) Establishment of a NFA-managed system to provide fuelwood and timber from sustainably managed forests. Forest supervision responsibilities transferred from NFA to DES FIMS to improve transparency in forest value chains (activity registration, timber resource tracking, etc.). 	<ul style="list-style-type: none"> Replacement system with BSYs remains conceptual, with only 1 BSY under construction Insufficient government budget to invest in sufficient BSYs (15 for the project region). There is a need to roll out BSYs across the country given the high-reliance on fuelwood in rural areas. Lack of SOPs, training modules, guidelines, etc. for new staff (train and onboard at least 6 staff per BSY) Weak capacities on topics related to marketing, financial and economic planning (need to build capacities to ensure that FMPs and business plans for BSY operations and wood marketing are linked and based on SFM) Limited awareness on the new fuelwood provision mechanism since the concept has yet to be implemented. Local people are aware that the social cutting program is being phased out, however there is limited awareness on BSY High rural reliance on fuelwood currently exceeds amounts that can be obtained from SFM, and additional investments are needed in energy efficient technologies and alternative fuels to fill the fuelwood gap (see following Chapters 5.3 and 5.4, including a description of related barriers).
Incomplete, unreliable and outdated forest information	<ul style="list-style-type: none"> NFI being conducted (ongoing) FMPs to be required for all districts FIMS modules will improved forest information and monitoring, creating transparent electronic databases 	<ul style="list-style-type: none"> Insufficient government budget to develop FMPs for all districts Limited capacities within NFA further limit the speed in which FMPs can be developed FIMS is in need of further technical and financial support, including institutional strengthening, and software development Lack of national emission factors

Barrier	How Forest Reform Addresses It	Outstanding Barriers/ Challenges
Inadequate financing for the forest sector	<ul style="list-style-type: none"> In the long-term SFM can generate revenue that can be reinvested back into forest management. 	<ul style="list-style-type: none"> Insufficient harmonization of NFI data and the country's GHG inventory Under-investment in the sector has created a vicious cycle of inefficient production, low-quality production and thus targets low-priced markets, ultimately preventing the sector's profitability.⁴³² In the short- and medium-term there is a major investment gap, especially to cover up-front investments, and staff. Majority of the above-mentioned barriers and challenges are all linked to the lack of government finance.

⁴³² World Bank 2019.

Summary

Most of the above-mentioned challenges and outstanding barriers can be addressed if there is sufficient financial and technical support. However, government budgets are extremely tight, and there is a clear need for additional external finance to invest in SFM and help overcome the aforementioned barriers. The following sub-chapter focuses on the financial baseline and existing government budgets, considering a key cross-cutting barrier for the implementation of SFM and the forest sector reform.

5.2.4.2 Financial baseline and barriers

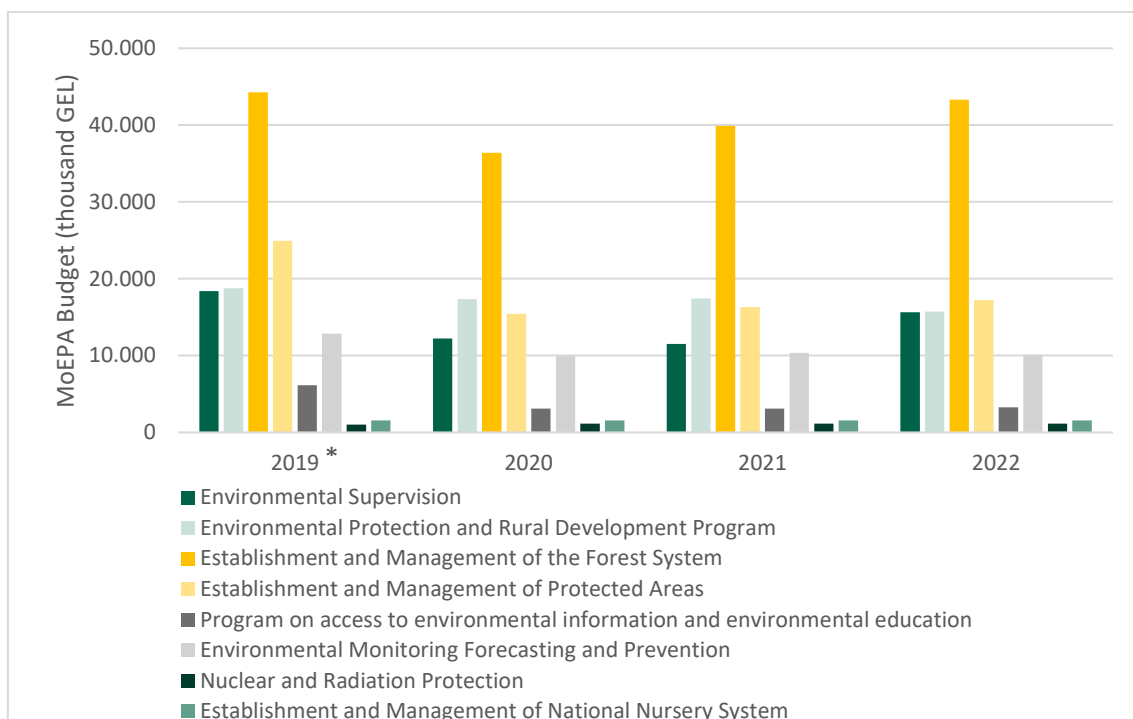
5.2.4.2.1 MoEPA

MoEPA Budget

MoEPA receives its budget from the state as well as from their own revenue (e.g. certain activities of NFA go to MoEPA (e.g. sanitary cuts), as well as fees from environmental licenses). In 2019, at least EUR 38.89 million (GEL 115.92 million) will be provided to MoEPA, of which 62% is from the state budget and 38% is from their own revenue (e.g. from sanitary cuts (NFA), and other environmental licenses). Majority of the Ministry's budget is dedicated to the management of forest land, followed by the establishment and management of protected areas, environmental supervision and the environmental protection and rural development program, among others.

In 2019, MoEPA requested an additional EUR 4.03 million (GEL 12.02 million) from the state (total of GEL 127.95 million), however it is not clear yet if this will be provided to the Ministry as it is above the ceiling set for budgetary negotiations. The additional finance is required for the establishment and management of the forest system (61% of additional funds requested), establishment and management of protected areas (36%), the environmental protection and rural development program (8%), and the program on access to environmental information and environmental education (4%), among others.

The Ministry's budget is expected to decline in 2020 to EUR 32.60 million (GEL 97.15 million), before slowly climbing to EUR 34.01 million (GEL 101.37 million) in 2021, and EUR 36.20 million (GEL 107.90 million) in 2022 (See Figure below). From 2019 to 2022, the biggest budget declines are expected for the establishment and management of protected areas (budget decrease of EUR -2.58 or GEL -7.71 million), the environmental protection and rural development program (EUR -1.01 million or GEL -3.01 million), the program on access to environmental information and environmental education (EUR -0.96 million or GEL -2.88 million), environmental monitoring, forecasting and prevention (GEL -2.80 million), environmental supervision (EUR -0.92 million or GEL -2.77 million), and establishment and management of forest land (EUR -328,187 or GEL -978,000).



*Figure 63: Planned MoEPA budget for 2019 to 2022**NFA to*

*Budget includes above ceiling request from MoEPA to MOF. It exceeds the budget ceiling by GEL 12.02 million.

**Additional annual requests are likely

Implications for project implementation

Budget cuts are likely to have a large impact on Departments such as DES, and NFA, who are already experiencing budget shortages with currently allocated funds (see following sub-chapters for a detailed description of NFA and DES budgets). This could negatively affect the effectiveness of forest sector reform if financing gaps are not filled.

5.2.4.2.2 DES

DES Budget

DES is fully dependent on Government budget for the implementation of their activities (see Table below). State budget covers staff costs, basic investments including uniforms, laboratory costs, office expenses, fuel and maintenance costs, vehicle and personnel (partial) insurance costs, basic equipment (flashlights, binoculars, truncheons, rescue vests, fire extinguishers and other low-cost equipment), and office building construction. It further covers the purchase of some patrolling vehicles, but often basic trucks are procured which are not suitable for many of the poorly maintained and rugged roads, especially in mountainous areas.⁴³³

⁴³³ Furthermore, in 2018 second hand cars were purchased that led to high maintenance costs, and resulted in many cars breaking down – ultimately limiting the effectiveness of such vehicles for forest supervision activities.

Table 48: Overview of DES budget for 2017, 2018 and 2019 (request)

Description	Factual data for 2017	Approved plan for 2018	Projected for 2019 (ceiling)	Request above ceiling	Total requirement for 2019
Environmental Supervision	10 050,1	10 891,0	11 300,0	16 700,0	28 000,0
• Staff number	391,0	411,0	427,0	459,0	886,0
• Expenses	8 962,8	9 738,0	10 675,0	10 784,0	21 459,0
• Salary	5 857,9	6 312,0	6 870,0	6 024,0	12 894,0
• Goods and Services	2 915,7	3 175,0	3 535,0	4 191,0	7 726,0
• Social security	43,6	60,0	70,0	40,0	110,0
• Other expenses	145,6	191,0	200,0	529,0	729,0
• Increase of non-financial assets	1 087,3	1 153,0	625,0	5 916,0	6 541,0

Source: DES 2018

For 2019, DES requested a budget of GEL 28.00 million, however they were only appointed a budget of GEL 20.67 million, resulting in a deficiency of GEL 7.33 million.⁴³⁴ The gap in financing particularly affected investments basic equipment (cars, uniforms etc.) for the new forest patrolling units. The staff for the forest patrolling units is being hired at the moment but no budget is available to equip these new personnel in 2019. Much needed investments in off-road vehicles for mountainous areas, motorbikes, drones, video-audio devices, cameras, camera traps, and computers is fully out of scope of the current and future budgets. Such equipment is considered highly relevant and important for improving forest supervision in the country (see Chapter 5.2.3).

Implications for project implementation

With growing staff (staff levels are expected to jump from 411 employees in 2018, to 681 employees in 2019, and 870 employees in 2020, requiring the onboarding of an additional 459 men and women) and the accompanying needs for additional training and technology to support their new mandate, DES's budget has gradually increased. However, the current budget is insufficient to cover the key investments in high-tech and innovative equipment, training needs (elaboration of up-to-date training modules, training trainers, implementing trainings, and improving knowledge management and training coordination), and operational improvements (e.g. SOPs, protocols, etc.) that improve the efficiency and effectiveness of forest supervision.

5.2.4.2.3 NFA

NFA Budget

NFA receives their budget from both state budget and their own revenue (see Chapter 2.1.1 for a breakdown of the revenue streams).

State budget for NFA fluctuated in the range of EUR 1.97 to 2.18 million (GEL 5.9 to 6.5 million) from 2005-2010, and in the range of EUR 4.94 to 9.72 million (GEL 14.73 to 29.98 million) from 2015-2019. NFA's budget has increased more than two-fold from 2015. The increase in NFA's budget is primarily attributed to an increase in NFA revenue generating activities.

⁴³⁴ DES 2018.

The following Figure provides a snapshot into NFA's budget sources, and the various fluctuations and trends they have experienced from 2015-2018.

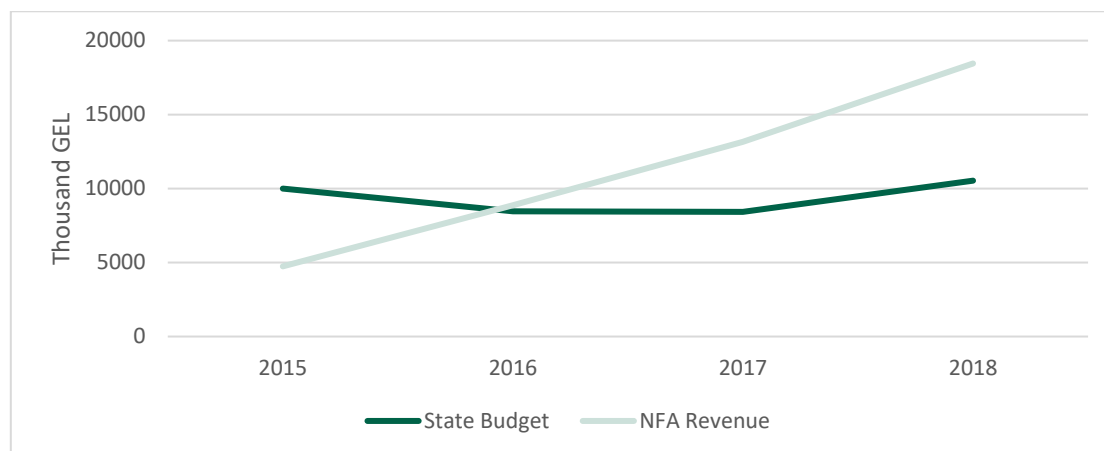


Figure 64: Overview of NFA budget sources (from state budget and NFA revenue) from 2015 to 2018

Source: NFA (provided directly for FS preparation)

NFA is dependent on state budget as well as its own revenues to cover its costs. In 2018, NFA budget expenditures reached EUR 9.66 million (GEL 28.88 million). Around 60% of NFA's budget was from their own generated income (EUR 6.15 million or GEL 18.45 million), and 40% was from state budget (EUR 3.45 million or GEL 10.35 million). This demonstrates a notable change since 2015, where 67% of NFA's budget was from state funding. While NFA's budget has increased in recent years, the financing needs are also expanding due to the increased necessity for investing in the forestry sector. In 2018, the level of expenditures was EUR 4.86/ha (GEL 14.48/ha), which is very low. In comparison, SFM implementation in many middle-income countries often requires investments in the range of EUR 250-270 per hectare.⁴³⁵

The budget is insufficient to cover the minimum basic forest management needs, as majority of it is dedicated to staff and administrative costs (60% of NFA's budget, of which 53% is from the state budget and 47% from NFA revenues). Forest use activities (cutting operations and harvesting) comprise an additional 30% of NFA's budget (20% is from state budget), which is deemed important as it is the principle revenue generating activity for NFA. Much needed forest maintenance and restoration activities comprise only 9% of NFA's budget (of which only 6% is from state budget). Forest inventory activities comprise less than 1% of the budget (entirely financed from NFA revenues). It is thus unsurprising NFA only managed to implement natural forest regeneration measures on 41.5 ha and reforestation measures on 15.4 ha in 2018.

NFA's 2018 Budget for the Project's 3 Target Regions

Such trends are further observed in the project regions (Guria, Kakheti and Mtskheta-Mtianeti – comprising 22% of the NFA-managed forest area actually covered by forest) Where NFA had a

⁴³⁵ Costs for SFM in a permanent (i.e. non-rotational) forest in China, based on an International Climate Initiative Project. It should be noted that costs for SFM can differ greatly based on the country and regional context (accessibility, labour regulations, currency, and inflation, among other factors), however forestry experts noted that SFM in many countries with a developed forestry sector would require investments within the range reported.

budget of EUR 2.1 million (GEL 6.3 million) for above mentioned activities in 2018 (an average of EUR 3.36/ha, below the national average).

Half of the budget was dedicated to administration and staff salaries, 40% on forest use activities, 6% on forest inventory, and the remaining 4% on forest maintenance and reforestation activities. The project regions are highly dependent on their own revenues for their budget, where 63% of their budget was from their own revenues – especially financing forest use, inventory and maintenance and reforestation activities. Again, it is not surprising to see how key forest management activities and investments have lagged (as described in Chapter 5.1.3).

Current staff comprise 3 chief foresters, 3 forest operation managers, and 33 forest work specialists. Considering that NFA will need 90 permanent forest work specialists, and an additional 428 seasonal forest work specialists – costs for staff will increase to implement an effective and efficient system of SFM. However, the existing budget is insufficient to cover such staff costs. This is not taking into account further investment needs to buy equipment, develop and maintain low-impact and resilient forest infrastructure, and build the capacities of new and existing staff.

Implications for the Implementation of the Forest Reform

Government budgets and NFA revenues are insufficient to cover the investment needs required to transition to SFM in Georgia (see Chapter 8 for detailed information on the financial and economic assessment). For the 8 districts alone over EUR 32 million is required for the first 15 years, of which just under two-thirds is required in the first seven years. While development partners such as SIDA, and SDC have expressed interest in continuing their support for the forestry and rural energy sector, they are unable to cover the substantial financing gaps alone.

The Government of Georgia has increased budget to the sector, in a clear signal of government ownership and commitment to the reform, however – it is still considered insufficient to cover the investment needs in the sector. Combined with additional Government co-finance, and co-finance from GIZ/BMZ, SIDA and possibly SDC, grant finance from the Green Climate Fund could support Georgia to fill this financial gap, and support a paradigm shift in the forest sector towards low-carbon development pathways through the scaling up of SFM and enhancement of carbon stocks (see Chapters 6, 8 and 9 for further information).

5.3 Energy efficiency and alternative fuels: potential to reduce fuelwood consumption and avert forest degradation

Deployment of energy efficient (EE) technologies and alternative fuel (AF) solutions can substantially reduce demand for fuelwood in the household sector. However, the market for EE and AF products is at a very nascent stage and there are many barriers both on the demand and supply side which prevent their uptake by the households at a scale needed to avoid forest degradation. This chapter starts with an overview of a broader policy and regulatory environment for EE-AF sector. It then presents and analyzes feasibility of various EE-AF solutions, along with technology-specific barriers to their deployment. In the end, conclusions are made regarding most technically, economically and socially feasible options, as well as an estimated scale of EE-AF product penetration in the target regions required to reduce demand for fuelwood to the level which is

sufficient to address fuelwood gap and ensure sustainable development trajectory of the forestry sector in line with SFM, in particular ecosystem-based forest management.

5.3.1 Policy and regulatory environment for EE-AF sector development

The Government of Georgia has committed to implement an ambitious reform agenda in the area of energy efficiency and renewable energy in line with its commitment as a member of the EU Energy Community which the country joined in 2017. As part of energy acquis, as mentioned earlier Georgia has undertaken to transpose several relevant EU Directives (See Chapter 2.3).

Adoption of the EU energy efficiency and renewable energy acquis transposition package will create an enabling policy environment for the long-term sustainable EE-AF sector growth. However, primary legislation is just an initial building-block in this process; its implementation will require development of secondary legislation, establishment of new and strengthening of existing institutions and capacity building at individual and organizational levels.

Remaining gaps therefore include:

- The primary law transposing requirements of the Energy Performance in Buildings Directive (2010/31/EU) was drafted but has not been adopted yet. There is no regulation setting the general rules and procedures for the energy performance certification of buildings, and allowing for classification, labelling and comparison of energy performance of buildings or building units – though these are under development.
- The legislative framework regulating the requirements for labelling of energy-consuming products (the Energy Labelling Directive – 2010/30/EU) is not fully approximated – as the primary legislation has been developed but numerous pieces of secondary legislation for many product groups have not been developed. This includes the labelling regulations for various types of heating devices, including local space heaters such as the solid-fuel stoves used commonly in Georgia.⁴³⁶
- There is neither primary nor secondary legislation in place to approximate the Ecodesign Directive (2009/125/EC) – though this is expected in 2019. See the following Info Box on the applicable provisions of the EcoDesign Directive.

⁴³⁶ See more information here: https://ec.europa.eu/info/energy-climate-change-environment/standards-tools-and-labels/products-labelling-rules-and-requirements/energy-label-and-ecodesign/energy-efficient-products/local-space-heaters_en.

Info Box 19: EU Ecodesign Directive

The Ecodesign Directive (2009/125/EC), in combination with the Energy Labelling Directive (2010/30/EU) are aimed at: a) increasing the energy efficiency of products and the level of protection of the environment; and b) providing consumers with information that allows them to choose more efficient products. The Ecodesign Directive bans the least efficient products from sale, while the Energy Labelling Directive encourages consumers to buy more efficient products, by informing them about the relative energy use of products. The Ecodesign Directive establishes a framework for the setting of Ecodesign requirements for energy-related products. To date, there are 29 Ecodesign regulations, 16 energy labelling regulations and 3 voluntary agreements, in particular the Commission Regulations (EU) 2015/1186 and 2015/1188 with regards to specific energy performance and labelling requirements for local space heaters. This regulation in addition to the energy efficiency criteria, defines requirements aimed at reducing other relevant environmental impacts, including: NO_x emissions for fuel-based local space heaters; and PM, OGC emissions and CO emissions for solid fuel local space heaters. Benchmarks for the space heating energy efficiency of solid fuel local space heaters established by the Directive range between 75% for cooking and heating stoves and 86% for heat-only stoves. The Regulation also introduces energy labelling requirements for solid fuel-based heaters; it also introduces a specific approach for local space heaters, a 'biomass label factor' set at such a level that class A++ can be reached by solid fuel local space heaters using pellets only.

The Ecodesign Directive (2009/125/EC), in combination with the Energy Labelling Directive (2010/30/EU) are aimed at: a) increasing the energy efficiency of products and the level of protection of the environment; and b) providing consumers with information that allows them to choose more efficient products. The Ecodesign Directive bans the least efficient products from sale, while the Energy Labelling Directive encourages consumers to buy more efficient products, by informing them about the relative energy use of products. The Ecodesign Directive establishes a framework for the setting of Ecodesign requirements for energy-related products. To date, there are 29 Ecodesign regulations, 16 energy labelling regulations and 3 voluntary agreements, in particular the Commission Regulations (EU) 2015/1186 and 2015/1188 with regards to specific energy performance and labelling requirements for local space heaters. This regulation in addition to the energy efficiency criteria, defines requirements aimed at reducing other relevant environmental impacts, including: NO_x emissions for fuel-based local space heaters; and PM, OGC emissions and CO emissions for solid fuel local space heaters. Benchmarks for the space heating energy efficiency of solid fuel local space heaters established by the Directive range between 75% for cooking and heating stoves and 86% for heat-only stoves. The Regulation also introduces energy labelling requirements for solid fuel-based heaters; it also introduces a specific approach for local space heaters, a 'biomass label factor' set at such a level that class A++ can be reached by solid fuel local space heaters using pellets only.

- The country has limited standard procedures and methodologies for the monitoring and reporting on end-users' energy consumption. For electricity and natural gas, there is sufficient information available from end-user meters, which is aggregated at a national level for statistical information purposes. For wood, there is some information gathered by public sector consumers regarding m³ consumed. There have been a few fairly comprehensive surveys to track wood consumption, but this is not done on an ongoing basis.

- There is currently no national building renovation strategy in place and very limited information on the sector available (in particular, on the building stock).
- The draft EE Law mandates that MoESD shall within six months of the adoption of law assign or create a designated body, Energy Efficiency Implementation Body or Energy Efficiency Agency (EEA). The EEA will have authority to implement national EE policies, including the process of transposition of the Ecodesign Directive, such as market surveillance/inspection and establishing Monitoring, Reporting and Verification (MRV) system to ensure compliance with Ecodesign requirements.

Info Box 20: National Accreditation Body

Georgia has a national accreditation body and allows private certification entities to conduct the certification process. The responsible body for accreditation of certification bodies which in their turn are responsible for issuing certificates of personnel qualification, is the Georgian Accreditation Centre (GAC). Founded in 2006, the GAC is the nationally recognized accreditation body of Georgia appointed by the MoESD. It acts under the law “Code on safety and free movement of products” from 2012. Its mission is to deliver the best accreditation services to the Georgian economy. Accreditation services include: a) Granting accreditation; b) Surveillance of accredited bodies. The GAC operates in full compliance with the internationally applied standard ISO/IEC 17011 and European practices which describe the basic codex of its behavior and in detail how an accreditation body has to be run. At present, the GAC can grant accreditations for personnel certification bodies according to ISO/IEC 17024.

- In line with provisions of the EU Energy Efficiency Directive (EED – 2012/27/EU), with regard to the purchase of certain products and services and the purchase and rent of buildings, governments which conclude public works, supply or service contracts should lead by example and make energy-efficient purchasing decisions. Georgia’s Draft EE Law provides that the Legal Body of Public Law – Public Procurement Agency – shall elaborate rules and guidelines on implementation of Energy Efficiency in the public procurement (Info box 13), considering consistency with cost-effectiveness, economic feasibility, wider sustainability, technical suitability.

Info Box 21: Energy Efficient Public Procurement

“Energy efficient public procurement” (EEPP) can be defined as the integration of energy efficiency improvement considerations into investments, maintenance and other expenditure on energy- using equipment and energy services. It includes practices such as life-cycle costing, the setting of minimum energy-efficiency standards, the use of energy efficient criteria in the tendering process, and measures to promote energy efficiency across organizations. Content wise, the specific elements that can be used to generate the energy efficient public procurement exercise can be grouped in four distinct categories, each of them corresponding to a specific part of the bidding documents.

Information in the Bidding Documents	Specific elements of an EEP
Requirements/Specifications	Mandatory product/services or works requirements (minimum standards which the product/service must meet) and (associated) desired requirements designed to reflect energy efficiency parameters.
Contract	Specific contract terms designed to secure the fact that the delivery of the product or the performance of the services/works meets the agreed requirements and secure the proposed energy efficiency features
Award criteria	Evaluation factors which will result in advantages granted to the bidders submitting technical proposals which demonstrate fulfillment of the desired requirements, resulting in benefits for the contracting authority.
Qualification requirements for the potential bidders	Technical and professional capabilities which will secure the selection of a supplier with capabilities and abilities in dealing with energy efficiency

Source: Energy Efficient Public Procurement Guidelines. EEP Guidelines – Common Document. Available at: <http://www.southeast-europe.net/document.cmt?id=682>

All in all, commitment of the Government of Georgia to adopt EE and RE policies and regulations creates conducive policy context for promoting EE-AF market. Full approximation, adoption and enforcement of these policies, however, requires substantial resources, time and institutional capacities. Georgia is working with a range of development partners to implement its comprehensive EE-RE policy reform package (see next sub-chapter). However, the scope of reform currently lacks focus on those segments of EE-AF market which would specifically target rural energy sector and fuelwood reduction technologies and alternative fuels. In the next sub-chapters when introducing specific EF-AF alternatives, these policy and regulatory barriers will be further elaborated.

5.3.2 Energy efficient technologies to reduce fuelwood consumption – status of market development

There is significant potential to reduce fuelwood consumption by deploying energy efficient (EE) solutions by rural households. However, the market for such alternative solutions is in a very nascent stage in Georgia, in particular in rural areas. There is only a limited number of local manufacturers or technology suppliers, the quality of their products and services vary significantly and so does the capacity to improve and expand their offer to the market. In this section we will provide an insight into the current market situation, identify most feasible EE solutions and analyze barriers to their widespread adoption.

5.3.2.1 Energy efficient (EE) heating solutions for households

A range of more energy efficient heating solutions is available in Georgia which can significantly reduce fuelwood consumption by the households. Opportunities vary between relatively simple and affordable locally-produced energy efficient wood stoves or imported analogous product with a higher price and quality to more sophisticated and much pricier boiler-powered central heating systems.

The most affordable options are locally manufactured, but non-certified EE stoves, which are produced in small workshops in small towns and villages throughout Georgia. Improved woodstoves have three common features: they have combustion chambers, air inlet control, and smoke chambers. These stoves are made one-by-one by hand without patterns or modern manufacturing techniques. They are usually priced at GEL 300 – 500, depending on the season and producer. One example of locally available efficient wood stoves is known as “Svanuri pechi” (Figure 65). These stoves consume 25 to 50% less wood and their thermal efficiency, according to the producer, is up to 75%. There are several varieties of these stoves on the Georgian market with different dimensions and prices.



Figure 65: Examples of Svanuri pechi stoves

Woodstove efficiency is also dependent on its application. Leaky houses, poorly sealed stove piping, and poor temperature control reduce the overall efficiency of the household heating system. To test the feasibility of domestically manufactured EE stoves and their acceptance by local population, GIZ implemented a demonstration project which involved installation of 20 improved stoves in rural households in combination with some building insulation measures. Despite certain variations, all participating households reported significant reduction in fuelwood consumption and energy cost, while at the same time improvement of comfort level and indoor temperature: households reported saving of 50% of fuelwood or approximately 4-4.5 m³ during the 6 months of the heating season. Cost savings were estimated at GEL 320-350 per household (at price of 1 m³ fuelwood of GEL 70-80).⁴³⁷

A range of even more energy efficient and durable imported wood stoves can also be found on the markets in urban centers. These products are characterized by much higher combustion efficiency and low level of emissions, most of them are EU-certified and compliant with requirements of EU Ecodesign Directive. However, due to the high price (from GEL 800, on average GEL 1,479), demand for such products is mainly concentrated in more affluent urban areas.

Among all alternative household heating options, the most efficient one is the boiler-based central heating systems. There are several companies specializing in design and installation of such heating systems for individual households in Georgia offering a turn-key services (design, technology and installation) and range of technologies (electrical, gas-based and fuelwood-based

⁴³⁷ Green Movement of Georgia/Friends of the Earth Georgia and Eco-vision 2015.

boilers).⁴³⁸ The major detriment to widespread adoption of the central heating systems is their very high cost: it would require GEL 2,500 – 3,000 per household to have such technology installed. Bearing in mind the very low level of income in rural Georgia, for most households this level of investment is simply unattainable.

5.3.2.2 Thermal insulation of buildings: high potential and very early status of market development

Thermal insulation of rural houses has high theoretical technical potential to reduce heat demand. However, the market for such services in rural Georgia is not yet developed and therefore reliable and verified information on cost and real saving impact of such measures were not possible to obtain. There is no organized group engaged in activities providing thermal insulation services and only fragmented possibility to receive these services exist.

While many thermal insulation materials are already available on the market in urban areas, their availability in rural Georgia is not given either. See Appendix 9 on suppliers/producers of insulation materials.

Most Georgian rural households heat an average area of up to 40 m². Thermal insulation of even such limited heated living space could result in at least 30% in energy saving. The measures could include replacement of up to 4 windows and doors of the living space and provision of additional thermal insulation to the ceiling and ground where applicable. Based on findings from a market study,⁴³⁹ it can be expected that such basic insulation package would come at a price of up to GEL 5,000. The prices were reported by market vendors to be GEL 20 /m² including materials and installation by workforce. This price is an estimate based on the mean heated living area (4 walls, ground, and ceiling) of 140 m² for GEL 2,800 and 4 windows for GEL 2,000; both prices were confirmed in consultation with skilled workforce in Tbilisi and are based on technical cost benefit analysis carried out by GIZ. Thermal insulation of the whole living space, including the ceiling, floor and equipping the external walls of the dwelling with additional insulation by professional workforce can bring up to 60% energy saving. This package, however, would come at a price of GEL 15,000, i.e. 3-times annual income of an average rural household. Taking in to account that 80% of rural households live on less than GEL 9,600/year and their access to loan financing is very restricted, it is highly unrealistic to assume they can afford investment in building retrofit, even on a limited scale, without substantial additional support from public sources.

Experience from other countries with similar dwelling characteristics and rural energy use patterns suggest that there may be a possibility to identify a more cost-effective package of building insulation measures for rural household by relying on locally available/produced materials and local labor force. For example, the French NGO GERES conducted extensive piloting of building insulation techniques in rural Tajikistan and developed a number of standardized solutions, as presented in Table 49 below. It can be seen that insulating the ceiling requires minimal investment and conserves a high amount of heat, in particular in combination with the installation of

⁴³⁸ See for example: https://www.hava.ge/en/heating/central-heating-boilers-c-1_24.html.

⁴³⁹ NAMA 2015.

double-glazed windows. Similar work will have to be undertaken in Georgia to find optimal combination of measures and jointly with local service providers and financial intermediaries develop an appropriate business and financial model for their implementation.

Table 49: Examples of insulation packages for rural houses in Tajikistan⁴⁴⁰

Part of the building to be insulated	Material used for insulation	Area, m ²	Cost of insulation, TJS	Coal Saving, kg	Payback period (years)
Outer Walls	Mineral Wool	50.1	4208.4	380	24.6
Ceiling	Reeds	32.1	385.2	305	2.8
Doors and windows	Double glazed & rubber	5.4	720	155	10.3
Outer Wall + Doors and Windows		55.5	4928.4	535	20.5
Ceiling + Doors and Windows		37.5	1105.2	501	4.9

5.3.2.3 Solar Water Heaters

Solar water heating (SWH) technology enables conversion of sunlight into heat for water heating. It is therefore an alternative solution for households to reduce their demand for fuelwood.

SWH systems presented on the Georgian market include storage tanks and solar collectors. The total volume of market is estimated about 700-800 units annually, which corresponds to GEL 1-1.5 million. There are two types of solar water heating systems: active, which have circulating pumps and controls, and passive, which don't. In Georgia SWHs mostly are imported from China, Germany, Italy, Turkey, and Bulgaria. The main importers of SWH equipment are companies "Saga", "Qebuli Climate", "Hava", "Tbili Sakhli (Casacalda)", "Sun House", "Technoboom", etc. They are importing active and passive solar systems with vacuum tubes; average tank volumes range between 140-340 litres and power is between 1.8-4.4 kW. Equipment cost ranges between GEL 550 – 2,500; installation costs are between GEL 150-500.

In addition to imported systems, two local producers in Georgia are active. Tbilisi-based Company "Heliotech – Solar Technologies" is an aggregation of four cooperatives and produces flat solar collectors which are 2 m² and have a capacity of 145 liters. The other local producer is also a Tbilisi-based company "Specheliotbomontage" which produces flat solar collectors with capacity from 150 to 400 liters.

The technology is already being increasingly used by consumers with a relatively high hot water demand (> 5,000 liters p.a.), such as SMEs, hotels, restaurants, where application of SWH is cost-

⁴⁴⁰ GERES 2016.

effective. Demand for SWH from the household sector remains limited: compared to relatively high upfront costs of SWH system, it delivers a rather small cost saving for households (heat demand for hot water preparation accounts only for about 7% of the total household energy demand).

5.3.2.4 Barriers to EE market development in rural Georgia

Demand-side barriers

High up-front costs of energy efficient technologies are a major barrier to their wide-spread adoption by households, which is further exacerbated by low level of incomes in rural Georgia. Prices for EE technologies vary significantly, but even the cheapest alternative is hardly affordable for an average rural household. Depending on the source and quality, the price of EE stove range between GEL 300-500 for a locally produced non-certified stove with relatively short lifespan and 800-1500 GEL for an imported EU-certified appliance with a lifespan of 10-15 years; the difference between price and quality is also illustrated in Figure 66. As has been explained earlier in chapter 5.1.3.1, only 10% of rural households earn more than GEL 800 per month and another 68% of households have monthly earnings below GEL 400. In other words, for the vast majority of Georgian rural households, their monthly disposal income is not sufficient to cover even the cost of a basic EE stove, let alone invest in a more expensive and efficient technologies, such as thermal insulation or central heating system.

The situation is being exacerbated by households' restricted access to bank financing. In the last several years, household debt in Georgia has been growing rapidly and the value of overdue loans is high. The National Bank of Georgia therefore has enacted as of January 1, 2019 tight regulations which significantly restrict banks' abilities to provide individual unsecured consumer loans without detailed analysis of customer's solvency. In particular, banks and micro-finance institutions (MFIs) have to calculate the loan amount based on the income of the potential borrower so that the borrower should not take the amount more than its financial capabilities allow. For example, anyone earning up to GEL 1,000 per month will be able to receive a loan in the amount at which monthly loan payments would not exceed 20% of income⁴⁴¹.



	
<p>Made in Akhmeta, Georgia, Efficiency: 75%, Price: ⁴⁴² GEL 320.</p>	<p>Made in Bulgaria, EU, Efficiency: 75%. Price: ⁴⁴³ GEL 1,400.</p>

Figure 66: EE stoves available in Georgia

⁴⁴¹ <https://commerciant.ge/en/post/loans-and-real-estate-will-fall-in-price-after-the-central-banks-regulations-come-into-effect>.

⁴⁴² GIZ 2016.

⁴⁴³ www.domino.com.ge.

Another important demand-side barrier is the lack of awareness among consumers about EE stoves and their benefits in terms of fuel and cost saving, comfort, etc. For example, according to Deloitte Consulting LLP (2013) 72% of respondents in rural areas did not know the meaning of energy efficiency at all and the only familiar EE technology to those who were aware of such term was an energy efficient bulb (See Figure 67).⁴⁴⁴

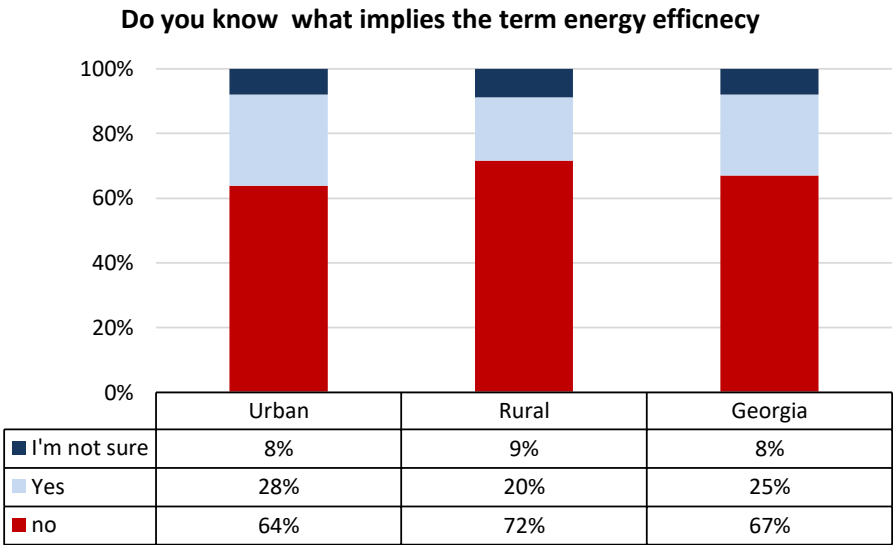


Figure 67: Awareness about energy efficiency among Georgian households
Source: Deloitte Consulting LLP 2014

Supply-side barriers

Suppliers of EE technologies for households in Georgia cater primarily to more affluent customer segment. As regards rural households their supply options are basically limited to artisanal workshops producing and selling EE stoves on the local markets. Official statistics about the number of local stove manufacturers and their production volumes does not exist. The survey conducted as part of this FS preparation estimated that there are 15 local producers with total production and sales volume below 500 units per year. Appendix 9 provides detailed information about availability and price of domestically manufactured efficient stoves. Due to almost non-existing demand for their product and the need to compete with conventional stoves (which are currently priced on average at GEL 70 on the local market), the supply of locally manufactured EE stoves is very low.

EE stove producers’ capacities and motivation to invest in modernization of manufacturing process, product improvement and business expansion are limited. Producers interviewed in the course of project development referred to stagnant demand being a major barrier for them to grow and expand.

Producers are also restricted in their ability to raise capital in order to invest in scaling-up production and unit cost reduction. These companies operate exclusively based on pre-paid orders and doesn’t keep large volume of stoves in stock (also due to limited storage capacities). The

⁴⁴⁴ USAID 2014.

largest EE stove producer in Georgia located in Akhmeta region, reported annual sales in the order of 200 units. Its current production capacities are sufficient to manufacture up to 1,000 stoves per year without substantial additional investment. However, to scale-up production capacity, build distribution network, ensure adequate O&M services, as well as better quality of the product in line with strict performance and environmental standards, significant additional investment will be needed. Georgian financial sector, however, is not able to offer financing to such enterprises on the terms and conditions which would suit their risk and return profile, this includes short tenues, high interest rates, collateral requirements, etc. Investment promotion and support scheme implemented by the Government of Georgia, such as “Produce in Georgia”, doesn’t extend their assistance to EE stoves producers either.

Quality issues and absence of testing and certification services: Almost all domestic manufacturers state that their stoves are high efficiency stoves with 75% efficiency. However, there is no basis for this claim, and the consumer does not know what the attributes of high efficiency stove are. In addition, the stove manufacturers are small craft shops with limited technical ability and manufacturing capacities to improve the efficiency of their stoves. Moreover, there is no testing lab to determine what stove efficiency is. Back in 2008 under USAID Rural Development a group of Georgian stove manufacturers were invited to trainings on efficient wood stoves and then for testing of their stoves. At the end of the program the certificates were issued stating the stove efficiency. Unfortunately, from the participants of testing program only Bioenergy Ltd is still on the market producing stoves. The efficiency of “Bioenergy” stove during the testing was 78% (Figure 68). In addition, with GIZ support efficiency of 3 locally produced EE stoves have been tested by the Georgian Technical University with resulting efficiency range of 65%, 68% and 75% respectively. It has to be noted that applicable benchmark for the space heating energy efficiency of solid fuel local space heaters adopted by EU ranges between 75% for cooking and heating stoves and 86% for heat-only stoves.⁴⁴⁵ At present no testing is available to check whether currently produced stoves are as efficient as during testing.



Figure 68: EE Stove Certificate by USAID Project

⁴⁴⁵ Commission Regulations (EU) 2015/1188 of April 28, 2015 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to Ecodesign requirements for local space heaters.

Policy and regulatory barriers

There are also policy and regulatory barriers to EE stoves adoption. Georgia does not have any regulations which establish minimum allowed level of energy efficiency or environmental performance for domestic appliances, such as heat stoves. In the absence of such requirements EE stoves have to compete on unequal footing with less efficient and more polluting appliances which dominate the market due to their cheap price. The draft EE Law calls for introduction of EE and environmental standards and labels in line with relevant provisions of the EU's Ecodesign Directive and EU labelling regulations (See

Info Box 19). Once fully implemented, approximation of the Ecodesign Directive can be expected to over time force the inefficient conventional stoves off the market. Even though the Government of Georgia is committed to gradually approximate the requirements of the EU Ecodesign Directive, there is no specific timeframe or roadmap for the date of effectiveness for standards and labelling. Due to the missing framework and low level of technical capacities, the implementation of the Ecodesign Directive will require extensive groundwork, in particular for domestically produced appliances, such as solid fuel heaters. For this reason, a phased approach to introduction of standards and labels is foreseen, with only a limited number of appliances subject to regulation in the first phase.

5.3.2.5 Conclusions

Regarding the current status and barriers to EE market development in rural Georgia, the following conclusions can be made:

- A range of EE technologies exist on the market which can substantially reduce household demand for fuelwood, such as domestically-manufactured or imported EE stoves, thermal insulation materials, SWH systems, and technologies for central heating systems;
- The prices of these technologies vary significantly starting from simple domestic EE stoves at GEL 300-500 up to GEL 2,500 for modern central heating system or GEL 15,000 for complete building insulation. Similarly, the energy saving potential of the existing solutions also differ. Figure 69 below illustrates these variations.
- Among available alternatives, an EE stove can be considered as the most optimal solution because it has relatively large fuelwood saving potential at the lowest price.
- Key barriers preventing EE stove market growth are poverty, access to consumer financing and low awareness on the demand side, as well as weakness of the supply chain and lack of conducive policy and regulatory framework, in particular EE and environmental standards and labelling for domestic wood appliances.

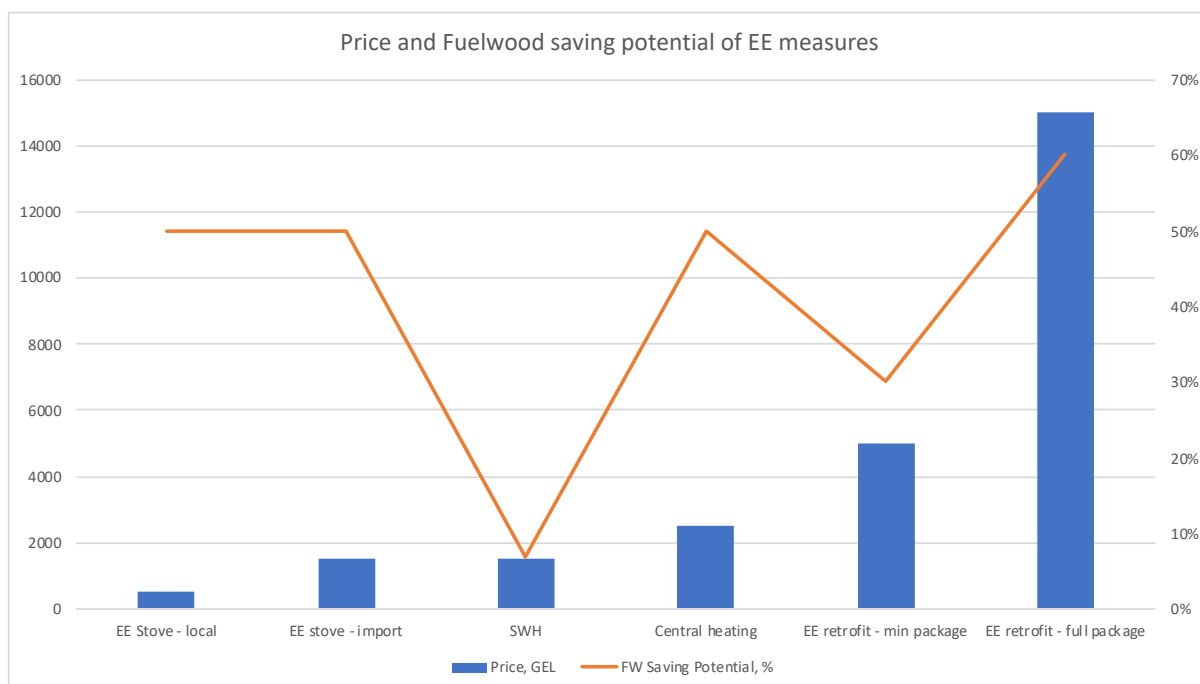


Figure 69: Price and fuelwood saving potential of EE alternatives

5.3.3 Alternative fuels to replace fuelwood – status of market development

5.3.3.1 Upgraded Solid Biofuels (USB): available alternatives and market status

Georgia possesses significant volumes of solid woody biomass residue, currently not utilized, that can be used for heating through production of upgraded solid biofuels (briquettes, pellets and chips) and considerably satisfy heating needs in the regions thus reducing demand for fuelwood. Alternative fuels (AF), such as Upgraded Solid Biofuels (USB) can be produced from woody or vegetable material by modern processes and technologies.

Wood Chips

Wood chips can be produced directly from existing waste biomass sources. The chipping can be done by mobile or stationary chippers or shredders. The main potential sources of biomass for chipping include:

- Urban tree trimming residues currently not used for fuel wood supply;
- Residues from any forestry operations left over after timber or fuel wood harvesting, that are currently left in the forests;⁴⁴⁶
- Timber processing industry;
- Energy plantations;
- Residues from tree and vine pruning in farms and orchards.

⁴⁴⁶ It is important that not all residues from forest operations are removed from the forest. At the moment legal regulations require removal of residues after logging to prevent fire and pests and diseases, but it is often not done. At least 5% of the standing volume shall always be kept as standing or lying deadwood, as noted in the Management-level Criteria and Indicators for Ecosystem-based Forest Management.

Air dried residues are preferred for chipping, however the shredding of newly cut tree branches can be considered as well. Wood chips require relatively big installations and storage space for fuel. Currently, there are few if any cases of using wood chips for heating in Georgia. Some businesses are using the chips in their technology cycles.

Hazelnut residues (nutshell)

Georgian large hazelnut growing sector is also a good source of USB. Hazelnut residues (nutshells) can be either burnt directly in the stove or used to briquette manufacturing (see next). Hazelnut shells are already used as an alternative heating source in cities and suburban areas in some of the regions, including Guria. Experience gained in hazelnut growing regions of Georgia positioned hazelnut shell as a good alternative to fuelwood. The calorific value of the shell – 18.0- 19.0 MJ/kg, is almost as high as that of oven-dry wood 18.5 MJ/kg. With the consideration of the fact that the wood burnt by population has high moisture content and low calorific value (10-12 MJ/kg) the hazelnut shells could be used very efficiently as fuel wood substitute both by population and for organization of autonomous heating systems in public buildings. As estimated and based on some monitoring figures received from households which switched from fuel wood to hazelnuts⁴⁴⁷, 1 ton of hazelnuts can substitute at least 3,5 – 4 m³ of fuel wood. The hazelnut shells can also compete with fuel wood by their price, i.e. GEL 0.22 per 1 kg. Hazelnut shells can be burnt in existing energy efficient wood stoves after slight modernization. Such modernization implies removing the exiting door of the wood stove and placement in the door hole hazelnut feeder (metal basket) which proved movement of shells by gravity into furnace. Such modernization can be performed by the experienced welder (Figure 70).

⁴⁴⁷UNDP N.D





Figure 70: Use of hazelnut residues for heat supply

Briquettes

Briquettes are clean biofuel (without chemical additives) obtained by pressing the raw material in two main types of technologies PINI Key and RUF. The specific density of briquettes is high and the moisture content is low – typically 10-12%. Calorific value of briquettes is high at around 5 kWh/kg. The preferred raw material for high quality briquettes is the dry sawdust from deciduous trees which used to be generated by parquet and furniture manufacturers. The feedstock for briquettes can be obtained from other biomass residues, including coniferous tree sawdust, straw, shredding of forestry, agriculture woody waste, as well as hazelnut residues. Table 50 presents overview of the various briquette types.

Table 50: Main types of fuel briquettes and methods for their production

<p>Briquettes (RUF-briquettes)</p> <p>The shape of a cake likes a small brick; it got its name from the German manufacturer RUF briquetting presses. Briquettes are made on hydraulic presses, at high pressure of 300-400 bars.</p>	
<p>Cylindrical briquettes – with a radial hole or not.</p> <p>Briquettes are made on hydraulic or impactor-mechanical presses at high pressure of 400-600 bar.</p>	

4- or 6-sided Pini & Kay briquettes with a radial hole.

Briquettes are made on the mechanical (Screw) presses through a combination of very high pressure (1,000-1,100 bar) and heat treatment (firing). Due to the heat treatment briquettes have a distinctive black or dark brown color on the outer surface.



The briquettes are usually packaged in plastic or paper to avoid increase in humidity and are easy to handle, transport and store. In Georgia, briquettes are already being sold in big supermarkets in 5-10 kg packs, making them convenient for handling, storing and distribution. They can be easily sold in small quantities in stores and this practice can be expanded in case of adequate supply and marketing of briquettes. Briquettes can be burned in any conventional stoves currently in use in Georgia, although due to high temperature of combustion, the cheapest stoves made of thin steel with no air control may be burned out rapidly.

The main advantages of briquettes compared to fuelwood are:

- Low moisture content – the lower the moisture content of wood, the higher the heat output. Normal wood moisture if stored properly is 15-20%. Moisture content of briquettes is below 12%, which is achieved due to the drying – compulsory stage of their production;
- High density – density of briquettes is about 950-1,000 kg/m³. The content of this fuel material per unit volume is much higher than that of fuelwood which ranges between 430 kg/m³ up to 770 kg/m³,⁴⁴⁸
- Wood briquettes have a substantially higher energy content (5 kWh per kg) than the equal volume of fresh fuelwood (2.5 kWh/kg) and due to this high energy density, they need less transportation volume and storage space;
- Unlike fuelwood, briquettes do not require drying as they are high humidity resistant;
- Burn with a minimum amount of smoke, do not “fire” and sparkle;
- Burn evenly and last longer;
- Can be burnt in wood stove (although conventional low-quality stoves cannot survey under such heat);
- Convenient for storage and transport due to their density and shape. When stored in the packaging they do not rot and do not dampen.

The last decade saw the emergence of briquette manufacturing industry in Georgia, but the growth has been very modest: there are only three producers with annual production volume of around 3,000 – 3,500 tons of briquettes.

The most experienced among Georgian manufacturers of briquettes is “NISONI” Ltd, which started production back in 2008 in Akhmeta, Kakheti. In the period before 2012 annual production was 1,500 tons of briquettes. The main clients were public buildings (schools, kindergartens) in Kvemo Kartli region. In 2012 the second plant was opened in Tbilisi, where 8 persons are

⁴⁴⁸ <https://roycestreeservice.com/wp-content/uploads/Wood-Fuels-Handbook.pdf>, p.7

employed. Current annual production has dropped and is only 1,000 tons due to stagnant demand. The current cost of 1 ton of briquettes delivered to the site is GEL 500/ton and the product technical specification is provided in Appendix 9.

Table 51: Specification of briquettes produced in Georgia

Specification	
Humidity	10-12%
Ash Content	1-1.5 %
Calorific Value	4 600 kcal/kg (minimum)
Packaging	
Packing Material	Plastic Wrap
Number of Briquettes per Package	10-12
Briquette piece size	Length – 25-30 cm; Diam. – 70 mm; Hole Diam. – 20 mm, density: 1,100-1,300 kg/m ³

Ecoline Energy was established in 2015 in Zugdidi (Samegrelo) and produces briquettes from the hazelnut shells, production capacity is 400 tons per month. The raw material is brought from the hazelnut processing plants and the selling price of briquettes is GEL 500 per ton. Last year the company produced 1,500 tons. The company has problems with sales as the demand is at locations at a far distance from the production site which makes transportation unprofitable.

KERA Company is relatively new company with 3 affiliated production facilities, Phshaveli village (Kakheti), Phartsokhanakanebi (Tskhaltubo, Imereti) and Zugdidi (Samegrelo). Last year the company produced 2,000 tons of briquettes and sold only half. The cost of the product including delivery is GEL 550-600. The raw material used is sawdust and hazelnut shells.

Wood Pellets

Wood pellets are an upgraded refined fuel for automated boilers and stoves, providing high efficiency and comfort to consumers. They require basically the same raw material as briquettes, have the same high calorific value and ease of handling and transportation. Due to the high capital cost of pellet burning stoves, pellets can be considered as a potential fuel only for high end wealthy individual consumers, as well as larger size public or private organizations who can afford initial capital cost of equipment but who may also have other options for heating.

Conclusions

Local market for the simplest forms of USB, wood chips and hazelnut shells, does exist in Georgia. The scale of this market is however hard to assess due to its localized and largely informal nature, as well as high regional differences in availability/supply of raw materials and demand. Briquette industry is rather small and existing production capacities are not fully utilized. There are no local pellet manufacturing plants in Georgia.

5.3.3.2 Biomass availability and supply options for upgraded solid biofuels (USB)

Forestry and agriculture are the most important sources of biomass supply for USB products. This section presents an assessment of the available biomass supply and potential for USB production in the three target regions. Data and information presented in this section come from

the national assessment of biomass potential undertaken by the World Experience for Georgia in 2014⁴⁴⁹, as well as additional data collection and verification by the GIZ expert as part of this FS preparation.

Forestry

The forest sector is the largest source of USB in Georgia. Wood waste biomass produced through forestry is originated from either a) biomass residues from timber harvesting and logging in the form of tree tops, branches and foliage, and sawdust or b) the biomass resulting of primary timber processing at sawmills, in the form of slabs, edgings and off-cuts, sawdust and fines, bark and various losses. The forest sector model developed for the 3 target regions of Georgia estimates annual potential for timber production in target regions at 193,658 m³. Consequently, only residues from primary timber processing could provide for 83,273 m³,⁴⁵⁰ of raw materials for heat supply, which can be utilized in the form wood chips, sawdust, briquettes or pellets.

Perennial crops

Perennial crops, such as vineyards, fruit orchards and hazelnut orchards, is another potentially large sources of feedstock for USB in Georgia.

Vineyards pruning residues

Vineyards have the biggest potential for USB with total estimated volume of residues of 76,467 tons in three project regions an equivalent of 1.4 PJ (

⁴⁴⁹ World Experience for Georgia. 2014. Assessment of Wood and Agricultural Residue Biomass Energy Potential for Georgia.

⁴⁵⁰ Based on proportion on waste generation in timber processing industry reported by FAO: <http://www.fao.org/3/t0269e/t0269e08.htm#TopOfPage>.

Table 52), mainly in Kakheti, one of the largest vine-growing regions in Georgia. There is a clear tendency to increase the area under grape plants through establishment of modern intensive vineyards; that is why the amount of biomass residues will most likely increase in the future. Vineyard pruning residues are produced by private farms and agricultural companies and are currently being burned or otherwise disposed of in non-sustainable manner. Assuming that at least half of existing resources could be collected and made available as an alternative energy source, the potential for USB supply from vineyards in the target region has been estimated at 38,233 tons.

Table 52: Availability of agricultural residues (fruit orchard, hazelnut, and vineyard) for alternative heat supply in target regions⁴⁵¹

Type of rop	Fruit orchard pruning residues				
Region	Area, ha	Residue, t/ha	Tonnes of residue available	Heating Value, MJ/kg	Energy Content, GJ
Guria	4 016	2,2	8 836	18,0	159 045
Mtskheta-Mtianeti	1 041	2,2	2 290	18,0	41 224
Kakheti	4 343	2,2	9 555	18,0	171 983
Total	9 400		20 681		372 252

Type of rop	Hazelnut orchard residues						
Region	Area of hazelnut orchards, ha	Residue, t/ha	Tonnes of residue available	Residue in the form of shells, t/ha	Among them residue in form of shell, t	Heating Value, MJ/kg	Energy Content, GJ
Guria	14 335	2,80	40 138	1,50	21 503	18,70	750 581
Mtskheta-Mtianeti	13	2,80	36	1,50	20	18,70	681
Kakheti	389	2,80	1 089	1,50	584	18,70	20 368
Total	14 737		41 264		22 106		771 629

Type of rop	Vineyard pruning residues				
Region	Area, ha	Residue, t/ha	Tonnes of residue available	Heating Value, MJ/kg	Energy Content, GJ
Guria	268	2,9	777	19	14 534
Mtskheta-Mtianeti	792	2,9	2 297	19	42 950
Kakheti	25 308	2,9	73 393	19	1 372 453
Total	26 368		76 467		1 429 937

Vine prune residues can be collected directly in the field, bailed, dried in bails, shredded (chopped) and then used for heating. Chopped residues cannot be used in ordinary fuel wood stoves, they can be burnt in energy efficient wood stoves if a special removable feeding bunker is adjusted to the door of the stove. This bunker is similar to the bunker used for hazelnut shell burning

⁴⁵¹ Estimates by GIZ project team based on national data from World Experience for Georgia. 2014. Assessment of Wood and Agricultural Residue Biomass Energy Potential for Georgia.

Table 52).

Another option is to produce briquettes. In project target municipalities there are briquetting plants, one in Akhmeta (NISONI Ltd) and the second in Telavi municipality, Pshaveli village (Kera Ltd). Currently both enterprises are manufacturing briquettes using wood processing sawdust, though they can switch to using chopped vine prune residues as raw materials. Such experience already exists in Kakheti, where in 2016 a briquette manufacturing plant started operation in Sagarejo municipality using vine tree pruning residues as the raw material. The plant is not operational at the moment due to organizational and managerial problems it encountered.

Fruit orchards pruning residue

Fruit orchards are also an important source of biomass. Total volume of residues in the target regions stands at 20,681, an equivalent of 0.4 PJ (Table 53). The total land area occupied by orchards is 9,400 ha, or about 23% of the total orchard area in Georgia. Assuming that at least half of that potential could be collected and used as an alternative energy source, the volume of available biomass can be estimated at 10,340 tons.

Hazelnut pruning and shell residue

The third biggest provider of agricultural residues in Georgia is hazelnut growing sector. Currently, hazelnuts represent 24% of Georgian agricultural exports. Guria is then main hazelnut producing region in Georgia: area – 14,335 ha, total residue – 40,138 t, including 21,503 t from hazelnut shells and the rest from the pruning residues. There are 26 hazelnut processing factories in Guria, including 24 in Ozurgeti and 2 in Lanchkhuti. Raw hazelnut is processed in the factories, where core and shell are separated. The shells are used for heating by population and small factories, and also are exported to Turkey. Pruning residues are not used but have a potential to be used for briquettes production or used directly, as the other types of pruning residues. Using similar assumption regarding 50% availability of residues for USB, the total potential in the target region stands at 20,632 t (both pruning and nutshells).

All in all, the total potentially available supply of raw materials for USB in the three target regions has been estimated at 129,548 tons an equivalent of 590 GWh (Table 53).⁴⁵² This would be sufficient to cover heating requirements of 33,000 households (using existing stove) or up to 78,000 if more efficient devices are used.

Table 53: Total availability of raw materials for USB products in target regions

	ton	GJ	MWh
Available forest residues	60,343	838,764	232,990
Available vineyards pruning residues	38,234	714,968	198,602
Available fruit orchard pruning residues	10,340	186,126	51,702
Available hazelnut orchard residues	20,632	385,815	107,171
Total	129,548	2,125,673	590,465

There are other potential sources of raw materials in the target regions, such as energy plantations and residues from annual crops (See Info Box 22). However, these alternatives are not immediately available for heat supply. Further assessment is required to identify appropriate conditions (e.g. combustion technologies for crop residues; land availability, crop selection and harvesting techniques for energy plantations) and select the most feasible technical and business solutions for their practical implementation.

⁴⁵² To be on conservative side, estimates assume 50% availability of residues from perennial crops and in the forestry sector biomass residues from timber harvesting and logging activities in the forests have been excluded.

Info Box 22: Annual crops

Annual Crops. Residues from annual crops, including straw of wheat and barley, corn stover and cobs, kidney bean, oat and sunflower can be as raw materials for USB. Wheat straw is mainly left in the field after harvesting or might be burnt in the field which is not a recommended activity since the land surface and soil fertility get degraded. In the best case the remaining straws are pressed in bales and taken for animal feeding or for commercial purposes. In the Kakheti region alone, over 100,000 t of straw is being produced from wheat, 19,000 t - from sunflower, and 2,000 t - from corn growing, which can make a substantial addition to the region's heat supply if collected and utilized.

5.3.3.3 Barriers to USB sector growth

Demand-side

The main barrier towards USB sector growth in Georgia is the lack of effective demand for such products among households. The stagnant demand in turn is the result of a combination of several factors. For example, briquettes, despite their positive qualities, at current market situation are not yet competitive with fuelwood, which is often free and easy to access. The price of wood chips or hazelnut shells could be significantly cheaper and comparable with the price of fuelwood; this is because their production is a less costly process and doesn't require investment in complex manufacturing technology and additional energy inputs. However, access to and supply chain for these materials is limited and geographically concentrated. In the course of stakeholder consultations conducted as part of this FS development, some consumers expressed their concerns about potential disruption and instability of USB supply to rural areas which make them reluctant to make a switch. This concern is directly related to the fact that the whole supply chain for USB is under-developed in Georgia and products are available only in few localities (e.g. close to hazelnut production or timber processing plants) or in urban centers (briquettes).

Supply side

Scale and stability

Scale and stability of the supply chain is a decisive factor in creating consumers' awareness about and confidence in new products, it is essential to their wide-scale acceptance and adoption by households. For this to happen, it is important to reach an optimal level of production which will contribute to increased scale of sales and reduction of prices. Some households are willing to switch to briquettes, but such orders are very small in their volume (1/2 ton and less) and do not justify transportation/delivery costs for producers. While for producers to invest in distribution and delivery chain, as well as in marketing campaigns, demand has to reach a certain scale which would justify such investment.

Availability and transport of raw materials

The key element of the USB value chain stability and, potentially, a barrier to growth is the availability of raw materials. Absence of sufficient and predictable supply of raw materials has been cited by several producers among the main risk factors for their business. In addition, transportation and logistics largely define the economics of production and consumption of USB. For example, vineyards are the biggest source of agricultural residues in Georgia, but their waste produced is not used as an alternative heating source, most of the residues are left in the field or burnt. According to farmers⁴⁵³, the transportation and storage costs are much higher than the value of other heating resource. Establishment of small-size briquette production facilities close to the raw materials and consumers can be a viable solution. As the vineyards are not distributed equally on the territory of target municipalities, investment in USB producing plant (chips or briquettes) must involve the development of a viable business plan and feasibility study specific to each production facility, because “as a rule of thumb, transportation distances beyond a 25–50 km radius (depending on local infrastructure) are uneconomical”.⁴⁵⁴ If optimal solutions for residue collection and transportation are worked out, the market price for briquettes can go down to GEL 320 /ton⁴⁵⁵ at which level they could become competitive with fuelwood. Entrepreneurs involved in USB supply chain are, however, lacking detailed information on availability and territorial distribution of raw materials, as well as expertise to conduct such resource assessment and develop feasible business models.

Access to finance

USB producers are restricted in their ability to secure funding to ensure stable supply of raw materials, let alone investment in expansion of production and distribution capacities. USB markets and production are highly dependent on seasonality. Waste biomass is more available from spring to autumn, while sales are likely to increase in autumn and winter. This creates liquidity constraints for the businesses due to the need to procure substantial amount of raw materials well in advance of the sales period. For the most part, producers now have to rely on expensive commercial loans (with interest rate at 14%) to bridge cash flow gap between procurement of raw materials and the sales of the products.

Policy and regulatory barriers

On the policy and regulatory side, there is no agreed upon renewable energy (RE) support or promotion scheme for renewable heat supply, nor other financial incentive mechanisms which would level the playing field for alternative fuels, such as briquettes. The draft National Renewable Action Plan (NREAP) envisages measures to “encourage the production of heating biomass from leftover fuelwood biomass in the woods and agricultural residues”, but does not specify specific mechanisms or policies in this regard as these have not been fully developed by the Government and there is little capacity for implementation. Also, the draft Law on Renewable Energy sources of Georgia articulates that the Government shall enact “the legal acts regulating construction set the requirement to use renewable energy heating and cooling systems and

⁴⁵³ World Experience for Georgia. 2014. Assessment of wood and agricultural residue biomass potential for Georgia

⁴⁵⁴<https://www.bioenergyconsult.com/biomass-transportation/>.

⁴⁵⁵ Chrystal Micro-Finance Organization. 2018.

equipment that achieve a significant reduction of energy consumption”. The only specific regulation envisaged in the draft EE and RE legislative package which could stimulate the USB market growth, is the provision in the draft EE Law regarding introduction of energy efficient public procurement by the State Public Procurement Agency. If operationalized, it can create initial boost and strong demand for USBs from public sector (e.g. procurement of briquettes by public institutions). However, for this to happen secondary regulations on EE procurement will have to be developed and capacity built among thousands of procurement officers across Georgian public institutions.

Conclusions

Having reviewed the current status and barriers to the development of alternative fuels market in rural Georgia and specifically in three target regions, the following conclusions can be made:

- A number of sustainable alternative fuel solutions exist in the target regions, including forestry and agricultural residues, which can be used for heat supply by households either in the form of wood chips, hazelnut shells or briquettes. When effectively utilized, available biomass can cover heating needs of 73% of the current fuelwood users thus substantially reducing the pressure on forest resources
- Supply of alternative fuels is highly localized and distributed: spatial distribution of raw materials determines economic feasibility of their supply to end-users
- In combination with an EE stove the use of alternative fuels for heating can offers a viable alternative to households
- Key barriers to AF market growth are related to the stability and availability of supply chain and the lack of scale in the sector, as well as lack of conducive policy and regulatory framework which would create a strong market signal and incentive to scale-up production.

5.3.4 Fuelwood saving potential in the target regions

Wider uptake of EE-AF solutions can substantially reduce demand for fuelwood from the local population. A model has been developed to estimate at which stage of market development the demand would not exceed available fuelwood supply under the SFM model. The model only takes into account EE stoves and USB as the most plausible and realistic alternatives.

Table 54 presents key assumptions used in the model. It is important to note that suppressed demand has not been calculated as increasing demand would involve heating more rooms in a house which would be a different technical solution (either more stoves or a different heating system).

Table 54: Key assumptions used in fuelwood model

Parameter	Value	Unit
Efficiency of conventional stoves	35 ⁴⁵⁶	%
Average household fuelwood consumption	8 ⁴⁵⁷	m3 (loose volume)

⁴⁵⁶ Lazashvili 2012.

⁴⁵⁷ Women in Europe for a Common Future (WECF) 2015.

Calorific content of fuelwood	2,167 ⁴⁵⁸	kWh /m ³
Average heating efficiency of an efficient stove	75 ⁴⁵⁹	%

For an average household, adoption of an EE stove would bring a reduction of fuelwood use by 53% or about 4 m³ over the heating season. Maximum potential for fuelwood saving from mass introduction of EE stoves in the region stands at 437,052 m³, assuming that there are 102,434 active fuelwood users in the target regions, including 54,696 in Kakheti, 21,910 in Guria and 25,828 in Mtskheta-Mtianeti.

Recalling that available fuelwood supply from the target districts under ecosystem-based forest management has been assessed to equal 264,532 m³ and additionally 94,000 m³ of fuelwood can be supplied from the other forest districts in the target regions, the total available supply stands at 358,532 m³, while the fuelwood consumption/demand at the moment is 725,155 m³⁴⁶⁰. The difference, or the “fuelwood gap”, in the volume of 366,623 m³, has to be addressed. Figure 71 and Table 55 present estimated potential for fuelwood saving depending on various penetration rates for EE stoves (ranging between 20% and 100% of the current fuelwood users). It can be seen that penetration rate of over 80% has to be reached for the fuelwood demand to match available supply.

⁴⁵⁸ GEOSTAT 2015.

⁴⁵⁹ Based on expert knowledge of the potential market.

⁴⁶⁰ CENN 2016.

Table 55: Fuelwood saving potential from EE stoves

Share of users, %	20%	30%	40%	50%	60%	70%	80%	90%	100%
Fuelwood savings, m3	87,410	131,116	174,821	218,526	262,231	305,936	349,641	393,347	437,052
Fuelwood demand, m3	637,745	594,039	550,334	506,629	462,924	419,219	375,514	331,808	288,103

Table 56: Fuelwood saving potential in target regions

		Share of EE stove users, %								
		20%	30%	40%	50%	60%	70%	80%	90%	100%
Share of AF users, %	10%	169,357.55	213,062.72	256,767.89	300,473.07	344,178.24	387,883.41	431,588.59	475,293.76	518,998.93
	20%	251,304.75	295,009.92	338,715.09	382,420.27	426,125.44	469,830.61	513,535.79	557,240.96	600,946.13
	30%	333,251.95	376,957.12	420,662.29	464,367.47	508,072.64	551,777.81	595,482.99	639,188.16	682,893.33

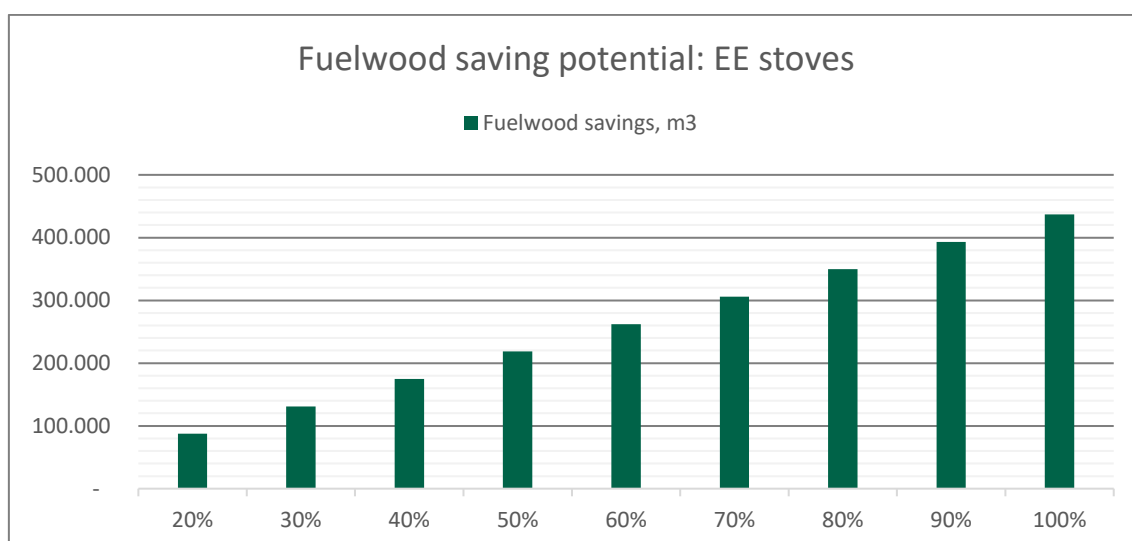


Figure 71: Fuelwood saving potential in the target regions: EE stoves only, m³

Switching to USB can generate additional fuelwood saving, i.e. up to 286,000 m³ (based on maximum availability of raw materials for USB in the region). Table 56 summarizes different scenarios of EE-AF market development and potential for fuelwood reduction depending on penetration rate of EE stoves and AF (assuming for the latter the maximum penetration rate of 30% due to limited availability of raw materials). For example, it can be seen that the fuelwood gap can be addressed if 70% of the fuelwood users switch to EE stove and additionally 10% also switch to alternative fuels. The same impact in terms of fuelwood demand reduction can be achieved at 30% penetration rate for the stoves and AF. In either case, a substantial scaling-up of the demand for EE stoves and alternative fuels is required to reduce fuelwood demand to the level which would enable sustainable forest management in the target regions.

5.4 Relevant past and ongoing donor support to both sectors

Several international initiatives and institutions have/ are providing technical assistance to the forest sector in Georgia. In designing the GCF project, extensive consultations have been carried out with diverse stakeholders, including other donors. The design of the GCF project largely builds upon the lessons learned from other donor projects and experiences in the country, and seeks to address and complement them. An overview of GIZ technical assistance in Georgia is provided, followed by brief summaries of key technical assistance projects in the Georgian forest sector.

5.4.1 Technical assistance of GIZ

GIZ is active in the forest sector since 2014. The regional project Integrated Biodiversity Management South Caucasus (IBIS, ends in 12/2019. Funded by BMZ and ADA) has a main focus on establishing the right conditions for the sustainable management of biodiversity. The project is supporting the creation of strategies and tools that will improve environmental decision-making. It concentrates above all on developing the managerial and technical expertise of the Armenian, Azerbaijani and Georgian governments. At local level, the project focuses on the management of natural resources at a number of pilot sites, where it is working to improve the sustainability

of resource use and enhance the protection of biodiversity in agricultural and forestry production systems. In Georgia, there is a specific component on sustainable forest management. The following processes are being supported:

Forest sector reform, including legal framework

Since the beginning of its operations in the sector, GIZ actively supported the development of the Forest Sector Reform Strategy and its respective action plan. A continuous inter-sectoral coordination under the “National Forest Programme” supports the implementation of the strategy. Furthermore, IBIS actively supports the finalization of the forest code and, once adopted, will provide support to develop the regulations on forest use, forest restoration and forest inventory.

Sustainable Forest Management

On the national level, GIZ developed the draft concept for Ecosystem-based Forest Management, which forms now the basis of future forest management under the new forest code. This includes the development of draft National Principles, Criteria and Indicators for SFM, which the Government will adopt once the new forest code passes the parliament procedures, and in addition under the ecological principle the development of detailed management level C&I for ecosystem-based forest management. GIZ also supports the development of a concept for Sustainable Forest Management Planning, which will be available by end of 2019.

In Kakheti region GIZ supports the pilot implementation of SFM with in Akhmeta municipality. This includes the development of action plans for pilot forest areas, implementation of respective forest management inventory, development of forest management plans and backstopping of implementation of FMPs. All activities will finalize by end of 2019.

National Forest Inventory (NFI)

GIZ supports the inter-agency Forest Inventory Task Force. The methodology and respective field manuals are developed and implementation of the NFI recently started. Initial results are expected in November 2019.

Forest Information and Monitoring System (FIMS)

The development and implementation of a FIMS supports the collection and management of forest data. GIZ assists in developing the concept, procuring the necessary technical services and hardware for the initial modules and setting the legally binding usage protocol (to be finalized in February 2020).

Capacity development in the sector

GIZ supports the academic and vocational education and implements practical trainings for NFA and DES staff. GIZ supports two VET colleges to implement courses for forest work specialists/ forest workers, by designing the courses, developing training materials, training the lecturers and procuring equipment. NFA and DES staff receive on the job trainings in forest operations, disease control mechanisms and law enforcement.

Based on the success of the IBIS project the German government provides additional support via the new regional project Management of Natural Resources and Safeguarding of Ecosystem Services for Sustainable Rural Development in the South Caucasus (ECOserve 12/2018 until 11/2021). The new project continues the successful work of IBIS in the forest sector and starts additionally to address the fuelwood consumption challenge through the following pilot activities in Georgia:

- Introduction of coordination mechanisms between various actors in the energy efficiency sector
- Introducing the energy efficiency topic in universities and schools
- Development of trainings
- Environmental campaigns
- Support to forest sector reform process

Furthermore, the global GIZ project “Information Matters: Ambitious Climate Reporting” is active in the country. In Georgia, the project supports the following activities of relevance for this project concept:

- Introduction of the partners to MRV in the forestry sector, especially in the context of the upcoming forest inventory
- Present existing guidelines for MRV elaboration in the forestry sector & discuss applicability to the Georgian context
- Stocktaking of exiting data to elaborate an MRV system for the forestry sector

These activities will set the base for the development and implementation of the MRV system through the GCF project.

5.4.2 Technical assistance provided by other organizations⁴⁶¹

5.4.2.1 Forest Sector

Scaling-up Multi-Hazard Early Warning Systems and the Use of Climate Information in Georgia	
Funding entity	GCF, Government of Georgia, (MoEPA, Ministry of Regional Development and Infrastructure, Ministry of Internal Affairs, City of Tbilisi), SDC
Timeframe	2017 - 2023
Financing volume	USD \$70.3 million
Project objectives and components	<p>The project objective is to reduce exposure of Georgia’s communities, livelihoods and infrastructure to climate-induced natural hazards through a well-functioning nation-wide multi-hazard early warning system and risk-informed local action. It has the following core components:</p> <ul style="list-style-type: none"> ▪ Multi-hazard early warning system and new climate information products supported with effective national regulations, coordination mechanism and institutional capacities. ▪ Expanded hydro-meteorological observation monitoring network outdated and inadequate network and modelling capacities secure reliable information on climate-induced hazards, vulnerability and risks

⁴⁶¹ Additional list of technical assistance programs and/or projects in the forestry and energy sector is provided in Appendix 10.

	<ul style="list-style-type: none"> Improved community resilience through the implementation of the MHEWS and priority risk reduction measures
Linkage/relevance for GCF project	<ul style="list-style-type: none"> Expansion of the meteorological observation network: Currently Georgia is lacking comprehensive and evidence-based research on the vulnerability of forest ecosystems to climate change, which could support further planning of actions to increase the resilience of forest ecosystems. Vulnerability assessments have to be underpinned with meteorological data and climate models. The expansion of the meteorological observation network will increase the quality of evidence of climate change, hazards, vulnerability and risks also for forest ecosystems. This is an important pre-condition for conducting sound vulnerability assessments by the GIZ GCF project. Risk zoning and maps: Similar zoning probably has to be done for the forest areas, based on the forest ecosystem vulnerability and risks assessments. If applicable, similar methodologies and approaches can be applied. Centralized multi-hazard risk information and knowledge system: Information from data collection of GIZ project could feed into the centralized multi-hazard risk information and knowledge system Institutional and legal frameworks and institutional capacity building: Adaptive forest management is not mainstreamed and integrated in forest management so far (except Adjara). Capacity development of forest management bodies is necessary. It is envisaged to integrate this topic into an institutionalized training system on sustainable forest management hosted by EIEC. The UNDP-SDC project envisages also to build up capacities of EIEC to host their respective training system. Efforts should be coordinated and harmonized. Coordination and knowledge exchange: The South-eastern Europe Climate Outlook Forum (SEECOF) and the example of the agricultural outlook forum provide an interesting link-up opportunity. The GIZ-GCF project could develop a similar outlook forum for forest. The expansion of the observation network and the development of climate products that include seasonal forecasts could also strengthen this new forum.
Planned results / impacts (ongoing project)	<ul style="list-style-type: none"> Strengthened use of climate information products/services in decision making in climate sensitive sectors Use by vulnerable households, communities, businesses and public sector services of Fund supported tools, instruments, strategies and activities to respond to climate change and variability Total geographic coverage of climate related early warning systems and other risk reduction measures established/ strengthened The observation network of all hydrological, meteorological and agrometeorological variables will be established to provide an appropriate level of spatial resolution of these variables. While this project will establish and rehabilitate these monitoring stations, their long-term maintenance will be assured by the government of Georgia and specifically by the NEA and MoEPA that has the dedicated staff and associated budget allocations for continued maintenance and operation of monitoring and early warning systems. Development of floodplain zoning and hazard and risk maps for all major basins in Georgia for key climate-induced hazards (floods, landslides, mudflows, avalanches, hailstorms and droughts), based on the most appropriate modern technologies and methods and aligned with international and regional standards.

Project name: Promoting sustainable forest management for climate resilient rural development in Georgia	
Funding entity	OEZA, implemented through Austrian Development Cooperation and Caucasus Environmental NGO Network
Timeframe	2018-2022
Financing volume	EUR 1,399,500
Project objectives and components	<ul style="list-style-type: none"> ▪ Effective intersectional interagency cooperation for sustainable management of forest resources established and functioning ▪ Regulatory framework and state programs for introduction of sustainable energy solutions prepared and related incentives created and tested ▪ Government has the tools to support programs that will enable and expand job opportunities through sustainable use of rural forest-related products ▪ Government has developed mechanisms for addressing integrated watershed management in the forestry sector to reduce disaster risks and improve climate resilience of local communities ▪ Capacity for informed public participation and evidence-based decision-making (central and local authorities, parliament) on sustainable and efficient resource management and DRR is in place and advances delivery of SDGs (7, 8, 12, 13, and 15), NDC, and EU AA targets ▪ Women's employment opportunities are increased and their income generating ability from multifunctional forest use is enhanced (SDGs 5 and 8)
Linkage/relevance for GCF project	<ul style="list-style-type: none"> ▪ Various synergies are identified with the project (e.g. improved inter-sectoral cooperation, strengthening regulatory framework for sustainable energy solutions and improved community outreach).
Achieved results / impacts	Not available

Project name: Sustainable Forest Governance in Georgia: Phase II	
Funding entity	Financed by Austrian Development Cooperation, implemented by Caucasian Environmental NGOs Network
Timeframe	2015-2019
Financing volume	EUR 1,000,000
Project objectives and components	<ul style="list-style-type: none"> ▪ Contribution to the successful implementation of forest reform in Georgia via the development of policy tools, modernization of forest management practices, strengthening the capacities of authorities and civil society, and enhancing issue-based policy dialogue.
Linkage/relevance for GCF project	<ul style="list-style-type: none"> ▪ Implementation of sustainable forest management practices ▪ Fuelwood management
Achieved results / impacts	<ul style="list-style-type: none"> ▪ Development of Forest Zoning Directive ▪ Development of a system of categorizing and strategic zoning of the forest area ▪ Elaboration of a National Program for providing population with fuelwood ▪ Development of regional information and involvement model – establishing 9th working group under the NFP, with a scope for regional cooperation development ▪ Advocating for forest policy priorities in other sectors: working on relevant sector development documents (National Environmental Action Plan (NEAP),

	<p>Agriculture Strategy and Action Plan, Rural Development Plans, Climate Change Action and Mitigation Plans, Energy Policy and Strategy, Socio-Economic Development Strategy) to advocate forest policy priorities in other sectors</p> <ul style="list-style-type: none"> ▪ Forest industry analysis ▪ Cost Benefit Analysis (CBA), identifying costing priority strategies and actions. The CBA covers the following: forest industry analysis; fuelwood production analysis; forest welfare function analysis; ▪ Forest carbon credit analysis
--	---

Project name: Global Forest Watch	
Funding entity	Financed by Global Environmental Facility (GEF), Environmental Systems Research Institute (ESRI) and Transparent World, the United Nations Environmental Program (UNEP), World Resource Institute (WRI) and Ministry of Environment and Natural Resources Protection of Georgia implement the project.
Timeframe	2015 – 2019
Financing volume	N/A
Project objectives and components	<p>Phase I: The project is focused on empower decision makers with technology and information. The project is to address key barriers to improve availability, transparency, timeliness and accuracy of Forest information and ensure information can be used and spark action.</p> <p>Phase II: The project aims to develop and apply an innovative GFW2.0 technology that will contribute to reducing deforestation, forest and land degradation, reducing illegal activities and supporting biodiversity conservation in the pilot countries, as well as on a global scale. It consists of four major components:</p> <ul style="list-style-type: none"> ▪ Application and enhancement of GFW 2.0 in pilot countries ▪ System uptake and replication ▪ Strengthening and sustaining the GFW 2.0 partnership ▪ Private sector application to reduce deforestation in supply chains
Linkage/relevance for GCF project	<ul style="list-style-type: none"> ▪ Development of FLUIDs, a web-platform and forest information system that will be embedded within FIMS. GFW will develop the system and pilot it for Adjara Autonomous Region. ▪ There have been concerns about the level of integration with FIMS, and how to best integrate FLUIDs. Within Activity 1.5 of the project this issue will be revisited, and efforts made to fully harmonize the FLUIDs within the overarching FIMS framework. The project will further support with scaling up the use of FIMS and FLUIDs for the rest of the country based on the early experiences. ▪ For the forest management planning processes, it leads to an interesting country wide information layer on opportunities for forest landscape restoration. The FMP development on district level will benefit from this map, and can use the identified restoration opportunity area to inform the FMP and annual action plans. However, the level of detail obtained from the forest management inventory and associated mapping exercises during the FMP process will lead to more precise information, and is directly linked with a set

	<p>of planned measures for forest restoration. So, step by step, the coarse opportunity map information can be turned into concrete restoration activities wherever FMP projects are implemented. The FIMS is equipped with a Web-GIS-portal, which enables users to embed all relevant spatial data sets, which support decision making in FMP or monitoring of forest development. Here the GFW data will be available for the forest sector.</p>
Achieved results / impacts	<ul style="list-style-type: none"> ▪ Phase I: Development of a 'Forest and Land-Use Atlas of Georgia: The first website that provides unique information and analysis tools regarding forest and land-use in Georgia: https://atlas.mepa.gov.ge/?l=en <ul style="list-style-type: none"> - Assessment and development of land use/forest data - Developed web-platform - Outreach and capacity building ▪ Adjara Autonomous region adopts the system (FLUIDS) as a critical information tool for collaborating on landscape-level, multi-sectorial initiatives ▪ Assessment and implementation of the system in Adjara autonomous region <p>Phase II:</p> <ul style="list-style-type: none"> ▪ GFW2.0 is adopted and its use demonstrated as a forest management tool to support the development and implementation of cross-sectoral integrated land use management plans and the development of innovative policies that integrate the perspectives of multiple Forest users ▪ Restoration Opportunity Map" that quantifies the area of restoration opportunity in Georgia. It is mainly based on latest available earth observation (EO) products, and seems to offers a technique to re-run the analysis in the future. However, due to pixel size the EO data cannot replace detailed FMPs.

Project name: Strengthening Sustainable Management of Forests in Georgia	
Funding entity	European Union
Timeframe	2016 - 2019
Financing volume	EUR 840,000
Project objectives and components	<p>The project has the objective to enhance the capacity of the state forest institutions in order to prevent and combat illegal activities in the sector, ensuring the sustainable management of Georgian forests, including legal harvest and trade of timber and non-timber forest products through harmonizing the Georgian forest regulatory framework to the EU standards and practices, directions and good practice, also by improving the forest information and monitoring system, as well as strengthening communication to this end between these institutions.</p>
Linkage/relevance for GCF project	<ul style="list-style-type: none"> ▪ GCF project took over the central training platform concept developed under the twinning project ▪ Support to FIMS for the elaboration of the forest information, monitoring and timber tracking systems, together with GIZ. This has set the foundation for where the project will continue to build up and strengthen FIMS.
Achieved results / impacts	<ul style="list-style-type: none"> ▪ Georgian forest related legislation including respective legal acts, regulations and directives provided input to support the revision and upgrading of these acts, regulations, directives, etc. in line with the better regulation approach and according to the EU standards and regulations

	<ul style="list-style-type: none"> ▪ Existing forest related regulatory framework evaluated and a report with recommendations and proposals prepared ▪ Assessment of existing national forest related strategy/action plan conducted ▪ The capacity of State forest institutions necessary for efficient fulfilment of their regulatory and institutional functions reinforced in line with best European and international practices/standards, ensuring the sustainable management of Georgian forests. Supported the: <ul style="list-style-type: none"> - Evaluation and necessary update of vision and mission statutes of state forest institutions under the MoENRP conducted - Reinforcement of experiences and knowledge of State forest institutions to successfully carry out duties in regard to legal harvest and trade of timber and NTFPs - Development of detailed concept of State Forest Enterprise for managing the state forests - Training of state forest institutions - Inputs to support the development and improvement of Forest information and monitoring system, including timber tracking system
--	---

Project name: ENPI Instrument East Countries Forest Law Enforcement and Governance II Program (ENPI FLEG II)	
Funding entity	The European Union and Austrian Development Cooperation finance the project. Project implementer are World Bank, World Wildlife Fund-Caucasus, and International Union for Conservation of Nature.
Timeframe	2013-2016
Financing volume	EUR 9,000,000
Project objectives and components	<ul style="list-style-type: none"> ▪ Elaboration of a new Forest Code of Georgia. National, as well as international experts are involved in the development process. The draft Code is elaborated and expected to be adopted by the Parliament of Georgia in 2018. ▪ By-laws and regulations for operationalizing the Forest Code developed ▪ Measure the true value of natural resources for community development ▪ Inventory in selected forest area conducted ▪ Sustainable forest management (SFM) plan for the selected forestry unit developed ▪ Assist the selected model forestry unit, where the SFM plan is implemented, in FSC certification (based on FSC standards and procedures) ▪ Report on methodology for development of sustainable multi-purpose forest management plans for Tusheti protected landscape is available; ▪ Full-scale TEEB study for forests located in Adjara (Georgia), including policy recommendations conducted and report is available ▪ Analysis of the Georgian forestry sector in the context of voluntary forest certification potential (including market opportunities for certified products), recommendations for applying key principles of the Forest Stewardship Council (FSC) standards (including HCV forest concept) have been prepared;

	<ul style="list-style-type: none"> Strengthen the system of forestry education by elaboration of strategic policy document and action plan covering all levels of education: secondary, high and vocational Create forest information database through development of GeoPortal for Georgian Forests - "Geo Forest Portal" and Forest Resource Center Increasing communication/visibility and raising awareness Demonstrate best practices for sustainable forest management and the feasibility of improved forest governance practices at the field-level on a pilot basis in all participating countries (subnational level).
Linkage/relevance for GCF project	<ul style="list-style-type: none"> TEEB study demonstrates the range of ecosystem services provided by Georgian forests in Adjara and demonstrates the economic losses due to degradation. Results have been used to design GCF project Enhanced collaboration between local communities and Adjara forestry sector informed approach for participatory SFM planning in GCF project.
Achieved results / impacts	<ul style="list-style-type: none"> Contribution to transparency in forest management and governance Enhanced collaboration between local communities and the forestry sector and has facilitated community participation in the sector for sustainable forest management. Intersectional collaboration and partnership of national governments with international organizations such as the EU and the World Bank Increased collaboration between neighboring countries on forest management.

Project name: Increasing the resilience of forest ecosystems against climate change in the South Caucasus through forest transformation

Funding entity	EU, implemented through WWF-Germany and WWF-Caucasus
Timeframe	2011 - 2014
Financing volume	EUR 1,838,913 (in total for 3 countries: Armenia, Azerbaijan, Georgia)
Project objectives and components	<ul style="list-style-type: none"> Increase the resilience of forest ecosystems in the Southern Caucasus against climate change impacts Improve biodiversity and livelihoods of local populations Selected forest stands vulnerable to climate change have been transformed into highly resilient "close to nature" forest stands The capacities of forest administration experts to develop silvicultural strategies to transform monoculture stands into stable, site-adapted forests are increased The awareness of local communities about the importance of forest rehabilitation with regard to mitigating negative biotic and abiotic impacts of climate change is improved
Linkage/relevance for GCF project	<ul style="list-style-type: none"> Results of studies on climate change adaption in forestry sector, particularly looking at how forest rehabilitation can improve the resilience of forests to climate change have been used to design the GCF project. Silvicultural guidelines will be used in trainings of the GCF project
Achieved results / impacts	<ul style="list-style-type: none"> Artificial forests, mostly monocultures of <i>Pinus negra</i> mixed with a few other tree and shrub species on pilot sites in Kashuri (144.07ha) and Tsavkisi were afforested with oak and other deciduous trees to strengthen climate change resilience

	<ul style="list-style-type: none"> ▪ Silvicultural guidelines for the transformation of monoculture stands into more resilient stands are elaborated, published in national and English languages and made available for relevant officials and experts
--	--

Increased climate resilience of South Caucasus Mountain Communities and Ecosystems through Wild-fire Risk Reduction (Armenia and Georgia) Status: Submitted, but not yet approved	
Funding entity	Adaptation Fund implemented by UNDP, Ministry of Nature Protection of Armenia, MoEPA Georgia
Timeframe	4 years once approved (has been submitted to the adaptation fund, but has not yet been approved)
Financing volume	USD 4.99 million
Project objectives and components	As described in Chapter 3, the risk of forest and wildfires are expected to increase with climate change (e.g. from increasing temperature and changing precipitation patterns). To combat such an issue, the UNDP managed Adaptation Fund project in Armenia and Georgia aims to increase the resilience of mountain communities and forest ecosystems through sustainable fire management practices and capacity building.
Linkage/relevance for GCF project	<ul style="list-style-type: none"> ▪ There are various synergies between the two projects, and thus the proposed project aims to use to the greatest extent possible the SOPs, training modules, and information generated by the adaptation fund project. The proposed project sees fire-management as a cross-cutting issue and will support the mainstreaming of suitable measures into FMPs (thinning, fuelwood removal, firebreaks, etc.). It also supports the procurement of fire-fighting equipment for regional offices. Tools such as the risk and vulnerability modeling tools developed in the Adaptation Fund Project can inform climate risk and vulnerability studies conducted in the proposed GCF project.
Planned results / impacts (ongoing project)	<ul style="list-style-type: none"> ▪ Strengthened institutional capacity, wildfire management systems and adaptation planning to reduce-climate induced wildfire risks and associated socio-economic and environmental losses: This includes: <ul style="list-style-type: none"> - Strengthening policy and regulatory framework for wildfire management and to incorporate climate change risks and adaptation strategies (incl. SOPs, local emergency plans, regulations on community-based firefighting teams, mainstreaming adaptation strategies into forest management, among others). - Strengthening institutional capacities for early detection and efficient response to wildfires - Supporting the institutionalization of firefighting trainings (including drills) - Enhancing capacities for firefighting in forested and protected areas (regional emergency units, relevant community voluntary firefighting groups), through capacity development and provision of equipment ▪ Improved climate and risk informed decision making, and enhanced use of climate information <ul style="list-style-type: none"> - Development of common modeling tools for risk and vulnerability of wildfire risk, monitoring and forecasting

	<ul style="list-style-type: none"> - Development of climate information and early warning system products - Establishment of common SOPs on climate induced hazards (info collection, reporting, etc.) - Demonstration of Climate Change Technology Accelerator ▪ Increased community and ecosystem resilience to climate change and climate induced risks <ul style="list-style-type: none"> - Scoping and implementation of prioritized local adaptation measures, and public awareness campaigns on climate-resilient local development - Enhancing resilience of mountain forest ecosystems through ecosystem restoration (reforestation and forest pasture management), and integrated mountain forest fire management measures (forest thinning, fuelwood removal, pest control, construction of fire breaks, and prescribed burning) - Enhancing knowledge and learning on climate resilient livelihoods and forest and wildfire management
--	--

Project name: Generating Economic and Environmental Benefits from Sustainable Land Management for Vulnerable Rural Communities of Georgia	
Funding entity	GEF implemented by UNEP, executed by the Regional Environment Centre for the Caucasus (REC Caucasus)
Timeframe	2018 - 2021
Financing volume	USD 6,258,630.00
Project objectives and components	<p>The projects objective is to develop and strengthen sustainable land management (SLM) practices and build capacity at municipal scale for their application for the protection of natural capital in Georgia. It has the following core components:</p> <ul style="list-style-type: none"> ▪ Creating an enabling environment at municipal scale for achieving Land Degradation Neutrality (LDN) Country Voluntary target ▪ Pilot implementation of measures avoiding degradation, intensifying sustainable land management practices and land rehabilitation to improve ecosystem functions and services ▪ Knowledge Management and Capacity Building
Linkage/relevance for GCF project	<ul style="list-style-type: none"> ▪ Mapping of Land Degradation trends and drivers: the project aims at mapping land cover changes and hot spots for four target municipalities totaling 590,000 hectares, including forest areas. Similar zoning probably has to be done for the forest areas, based on the forest ecosystem vulnerability and risks assessments. If applicable, similar methodologies and approaches can be applied. ▪ Capacity building: Improved understanding of the economics of land degradation and land use planning in national and sub-national government institutions. ▪ Opportunity to promote coordination in Kvareli to enhance information dissemination and awareness raising. Otherwise the activities are focused at the municipality level, and are not working with the same actors and forest land use (afforestation, agriculture, windbreaks).

Planned results / impacts (ongoing project)	<ul style="list-style-type: none"> ▪ Municipalities are increasingly able to implement LDN country strategy at municipal scale in four target municipalities ▪ Reduced impact severity of erosion, salinization and fertility of soil, in 10,000 ha of affected ecosystems in Sagarejo, Kvareli, Gori, and Kareli through restoration ▪ Farmers apply sustainable land management and climate smart agricultural practices in support of food security and resilience on 10,000 ha of pilot plots ▪ Improved municipal development strategies and easily accessible knowledge about SLM practices to inform policy making ▪ Improved understanding of the economics of land degradation and land use planning in national and sub-national government institutions
--	---

Project name: Applying Landscape and Sustainable Land Management (LSLM) for Mitigating Land Degradation and Contributing to Poverty Reduction in Rural Areas	
Funding entity	GEF implemented by UNEP, executed by Ministry of Environment Protection of Georgia through Regional Environment Centre (REC) for the Caucasus
Timeframe	2016 - 2019
Financing volume	USD 4,622,114.00
Project objectives and components	<p>The project objective is to support integration of good Landscape and Sustainable Land Management (L-SLM) principles and practices into national policy and institutional framework to ensure adoption of economically viable practices by rural communities. The Project consists of three main components:</p> <ul style="list-style-type: none"> ▪ Policy, regulatory and institutional reforms to mainstream L-SLM practices; ▪ Demonstrating benefits of introducing best L-SLM practices in the production system; ▪ National capacity development and knowledge Management.
Linkage/relevance for GCF project	<ul style="list-style-type: none"> ▪ Web-portal with maps: for the whole territory of the country to serve the governmental entities and other stakeholders with proper information on land degradation and L-SLM. These maps could be an important source of data for the GCF project ▪ Vulnerability profiles: for Dedoplistskaro and Akhmeta municipalities – not clear if covering forests ▪ Capacity development and knowledge management: the project conducts trainings on L-SLM practices targeting at least 100 national/sub-national decision makers and local/community representatives.
Planned results / impacts (ongoing project)	<ul style="list-style-type: none"> ▪ Adequate legal, policy and institutional framework on L-SLM at national level ▪ Increased understanding of SLM and its contribution to livelihoods at local level ▪ Capable national stakeholders to develop and manage SLM issues

5.4.2.2 EE-AF

Project name: Testing of Insulation Measures in Dedoplistskaro region (Sustainable Management of Biodiversity in South Caucasus)	
Funding / Implementing entity	GIZ
Timeframe	01.09.2014-30.04.2015
Financing volume	47,520 GEL
Project objectives and components	<ul style="list-style-type: none"> • Development and use of clean energy technology by demonstrating renewable energy and energy efficient systems for domestic use, which will allow widespread implementation of these systems; • Identify local needs and opportunities of local communities to explore the potential for upscaling of alternative energy technologies; • Promoting alternative energy technologies in 4 target communities by demonstrating alternative energy systems affordable for local conditions to enhance energy security within the area and stimulate up scaling. • Scientific calculation and standardized energy efficiency test carried out in the laboratory of the technical university
Achieved results / impacts	<ul style="list-style-type: none"> • Development and use of clean energy technology by demonstrating renewable energy and energy efficient systems for domestic use, which will allow widespread implementation of these systems; • Identify local needs and opportunities of local communities to explore the potential for up scaling of alternative energy technologies; • Promoting alternative energy technologies in 4 target communities by demonstrating alternative energy systems affordable for local conditions to enhance energy security within the area and stimulate up scaling. • Scientific calculation and standardized energy efficiency test carried out in the laboratory of the technical university

Project name: Expansion and Improved Management Effectiveness Of Adjara Regions Protected Areas	
Funding / Implementing entity	UNDP in Georgia
Timeframe	10.2016-10.2017
Financing volume	20,418 USD
Project objectives and components	Implementation of the Action Plan for Undertaking Field Testing of Selected Technical Solutions in Machakhela National Park Support Zone villages. In the period November, 2016-April,2017 (heating season 2016/17) the fuel switch from fuel wood to alternative fuels- two types of briquettes and hazelnut shells was monitored in Kedkedi public school two classrooms and hazelnut shells in 11 families of three villages (Kedkedi, Qveda Chkhutuneti & Zeda Chkhutuneti).

	<ul style="list-style-type: none"> Another technology tested and monitored in the period April-September 2017 was solar thermal collectors introduced in 5 households for hot water preparation to replace fuel wood usage for this purpose.
Achieved results / impacts	<ul style="list-style-type: none"> During the heating season 2016/17 introduction of two types of briquettes and hazelnut shells in two classrooms of the Kedkedi school and switch from fuel wood to alternative fuel-hazelnut shells in 11 families resulted in saving (not using) of more than 100 m3 of fuel wood; If compared current prices for fuel wood and hazelnut shells, even with the consideration of additional cost for modernization of existing stoves, the usage of hazelnut shells is economically attractive and during the heating season 2017/18 switch from fuel wood to hazelnut shells will be implemented in 52 families. Such switch means that more than 10% of families have made their choice in favor to hazelnut shells and fuel would consumption in Machakhela NP support zone villages during the winter 2017/18 will decrease by at least 510 m3. The total cost of received energy during the summer (April-September) by the 5 solar systems installed in the families in Machakhela NP support zone villages is estimated to be up to 1960 GEL. The free heat energy provided by the solar systems exceeded almost 1,5-2 times the energy consumed by families for hot water preparation in past. Increased awareness of population on alternative energy sources as substitute to fuel wood; Increased knowledge and capacity of community members to mobilize and unite into a group to solve common plan on decrease of fuel wood consumption in Machakhela NP support zone villages.

Project name: Promotion of Biomass Production and Utilization in Georgia	
Funding / Implementing entity	Global Environmental Facility (GEF)/UNDP
Timeframe	July 2013 – September 2017
Financing volume	US\$ 911,736
Project objectives and components	<p>The objective of the project was to promote sustainable production and utilization of upgraded biomass fuels in heating applications in the municipal services sector of Georgia.</p> <p>The project was structured in four different Outcomes:</p> <ul style="list-style-type: none"> Outcome 1: Enhanced policy and regulatory framework for promotion and efficient utilization of biomass energy in Georgia Outcome 2: Increased market confidence in the feasibility of production of upgraded biomass fuels and their utilization in municipal heating applications Outcome 3: Created local supply of and demand for upgraded biomass fuels Outcome 4: Improved knowledge and stakeholder capacities for bioenergy development and replication

Achieved results / impacts	<p>National Bioenergy Strategy was elaborated and agreed with all stakeholders. The Strategy has been used as an input in the National Renewable Energy Action Plan (NREAP) and National Energy Strategy of Georgia</p> <p>A number of quality standards (room heaters fired with solid fuels; wooden briquettes; wooden logs) were created with the support of local expert, reviewed by Project's international Biomass Expert and agreed with all major stakeholders. Standards were developed based on the European standards taking into account Georgian circumstances and have been submitted to the Georgian National Agency for Standards and Metrology (GNASM)</p> <p>A detailed inventory of available woody and agriculture biomass in Georgia is completed</p> <p>Three pilot productions on producing wood briquettes (National Nursery, Nisoni, Greenergy) were set-up with investment grant from the project</p>
-----------------------------------	--

6 PROJECT DESIGN

6.1 Project objective

The transition to SFM, combined with the increased adoption of energy efficient technologies and alternative fuels will initiate a paradigm shift towards low-carbon development pathways. The Tables in the following sub-chapter describe the barriers that limit the transition to i) SFM, and ii) the adoption of energy efficient technologies and alternative fuels, as well as the project's approach to address these barriers.

The Project will enable the Government of Georgia to implement its transformational forest sector reform agenda to put the entire nation's forests under the SFM framework. It will do so by supporting the establishment of a nation-wide SFM system under Component 1, including covering 270,807 hectares of NFA-managed forests with SFM (in line with the NDC target of 250,000 ha) as a starting point for implementation of the national system. In parallel, under Component 2, the Project will promote market development for energy efficient (EE) and alternative fuels (AF) to address main driver of Georgia's forest degradation, the unsustainable fuelwood consumption by rural population. It is expected to ensure 30% market penetration rate for EE stoves and AF in the target regions and up to 75% in the long-run as a result of rapid scale-up of the supply and demand and private investment in EE-AF market (see Figure below).

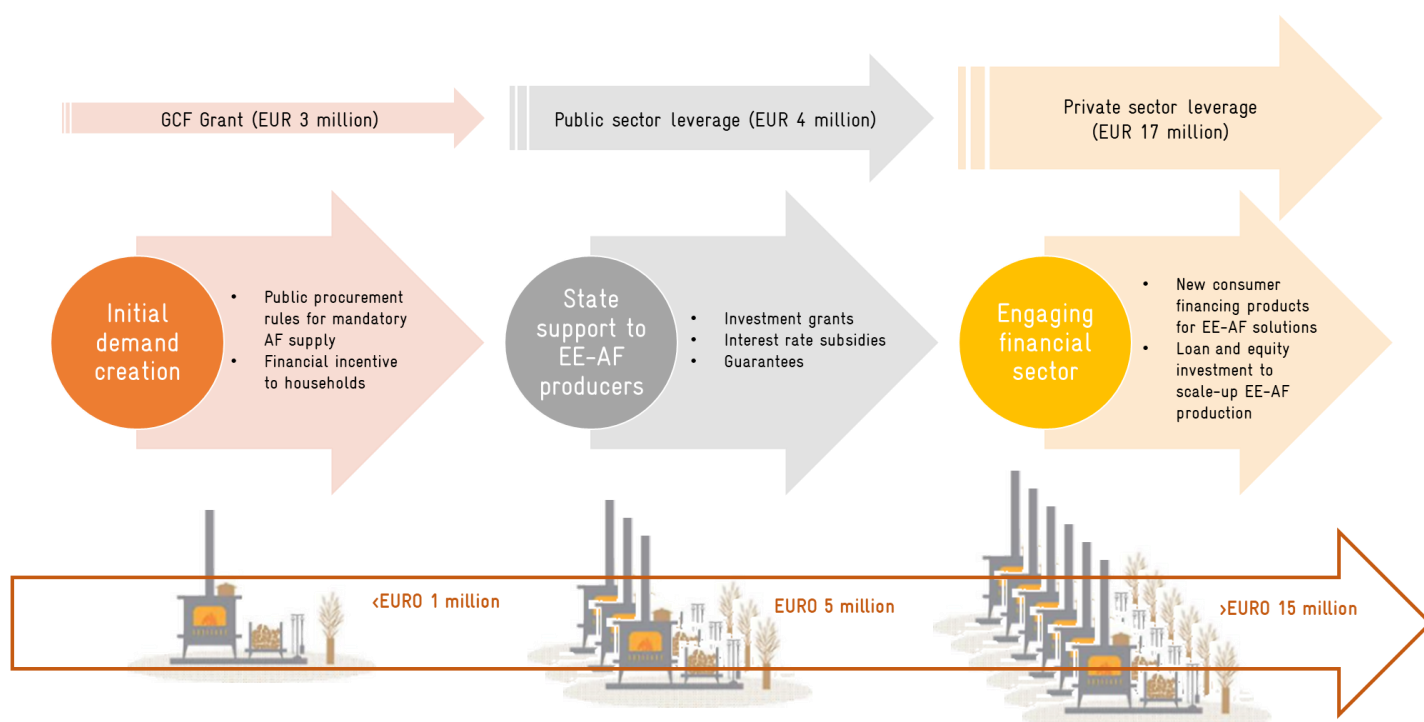


Figure 72: Market development for EE stoves

At the same time the implementation of SFM will gradually increase, reducing the needs for enabling investments (especially forest access roads and skidding trails), and building up capacities in the public and private sector.⁴⁶² It will take nearly seven years to reach nearly full operating capacity for the effective implementation of SFM measures in the eight target districts. Implementation of SFM will lead to the improvement of quantitative and qualitative characteristics of the forests and gradual build-up of carbon stock. Broader SFM implementation will lead to a reduction of forest degradation in the range of 0.8 t biomass per ha and year (1.3 tCO₂/ha/year); in addition, forest biomass will increase by 1.7 t biomass per ha and year (2.9 tCO₂/ha/year) as a result of direct SFM measures.

Through the project capacity of NFA will be established to sustainable fuelwood supply provisions and as a result availability of sustainably harvested biomass in the regions will increase five-fold from around 50,489 m³⁴⁶³ up to 285,575 m³ by the project end.

In parallel, the project will accelerate adoption of EE-AF solutions among 100,000 fuelwood-dependent rural households (40% of the population in the target regions). It will significantly diminish pressure on forest resources and demand for fuelwood, i.e. by up to 360,000 m³ or 50% compared to baseline. Taken together, SFM and EE-AF adoption will make sure that supply of sustainably harvested biomass in the target regions can meet the demand in year 7 of implementation, thus effectively reducing the fuelwood gap, which currently stands at 580,000 m³ (see Figure below).

⁴⁶² The implementation of SFM requires an approach that ensures a learning curve based on the gradual scaling up of activities, that accounts for substantial time and resources to be invested early on in capacity development and infrastructure that facilitates SFM in the future. First of all, by year 1 of project implementation it is expected that only 4 districts will have approved or nearly approved FMPs. The development of new FMPs in the remaining four districts will require training on new regulations, and will be carried out over a period of two years, considering staff capacities. More detailed information is provided in Feasibility Study Chapter 5.3.

⁴⁶³ Estimated volume of sustainably harvested fuelwood which NFA would be able to supply at current level of its operational capacities.

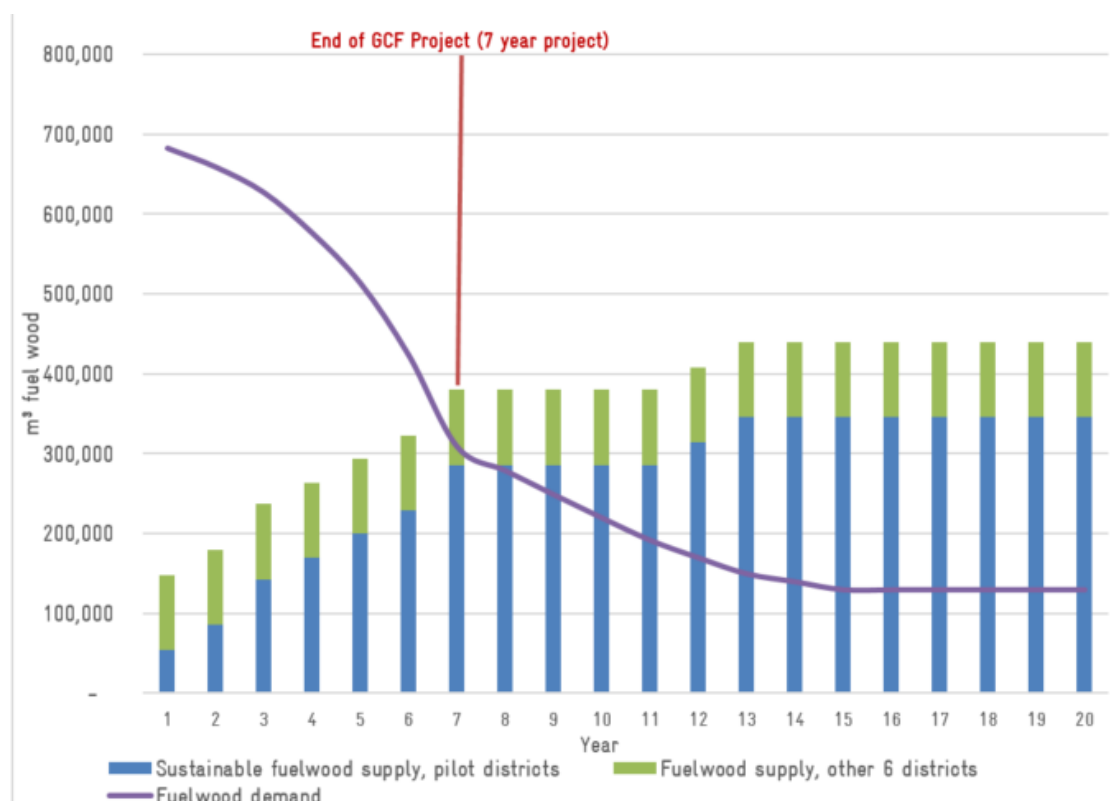


Figure 73: Overview of fuelwood demand and supply from sustainably harvested forests in the three project regions (Guria, Mtskheta-Mtianeti, and Kakheti)

Source: Fuelwood supply based on SFM scenario developed in the forest model described above, fuelwood demand from CENN Household Study (2016)

Tackling both, the underlying driver of the degradation by making fuelwood use more efficient and by improving the management of the undervalued forest resource, has the potential for a paradigm shift if social, ecological and economic criteria are integrated in the new management regime. This will translate in a direct climate impact: unsustainable biomass extraction will be reduced on one hand and on the other incremental growth in the more resilient forest will increase (+2.79 tCO₂eq/ha/year; increase in wood increment from 2.7 to 3.5 m³/ha/year). The amount of CO₂eq remaining sequestered in standing forest will increase, thereby reducing GHG emissions from forest degradation and enhancing carbon stock by at least 5.30 million tCO₂eq by the project end and 16.14 million tCO₂eq over a 20-year project lifetime (see Figure below).

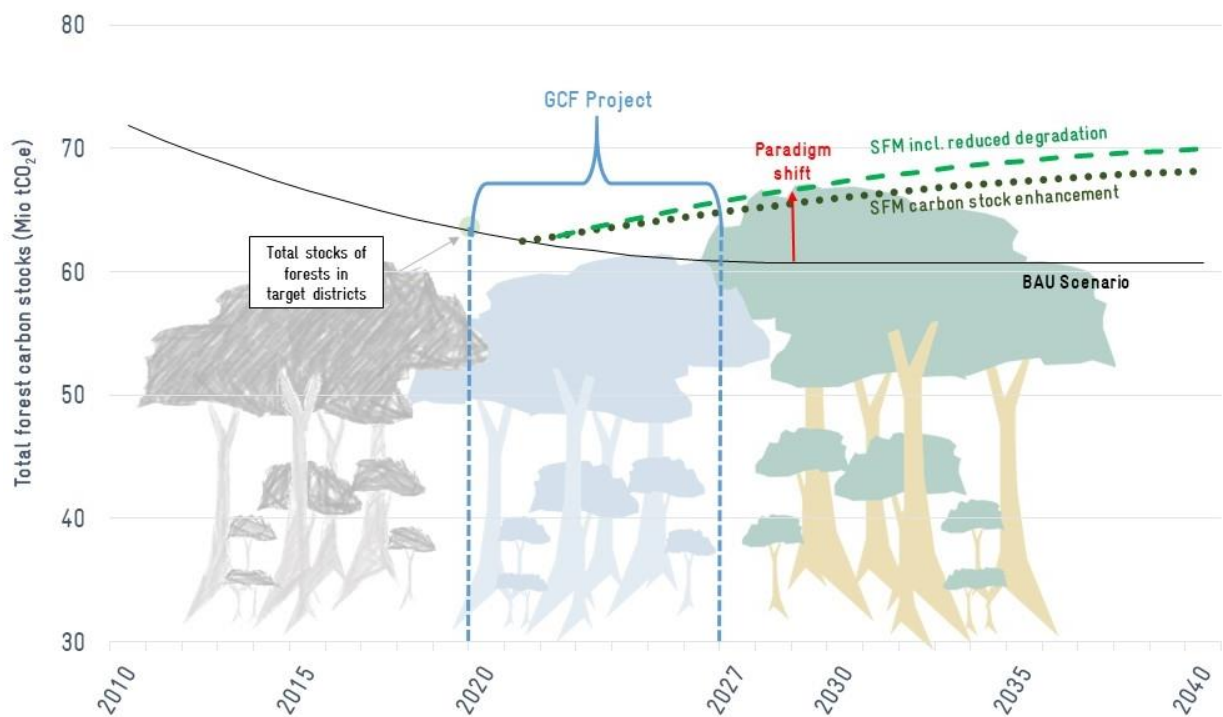


Figure 74: Carbon stocks in forests - paradigm shift

The project will follow a two-pronged approach to address underlying root cause of forest degradation, i.e. inadequate forest management and high demand for fuelwood (see Figure below): with Component 1 aiming at operationalizing and scaling-up implementation of SFM, while Component 2 aiming at promoting development of EE-AF market, specifically for rural areas. A socially just transition to the new forest management approach in Component 1 and 2 is facilitated by Component 3: Strengthened municipal institutions and intensified citizens' participation in forest management, combined with diversified livelihood opportunities through the generation of employment and income.

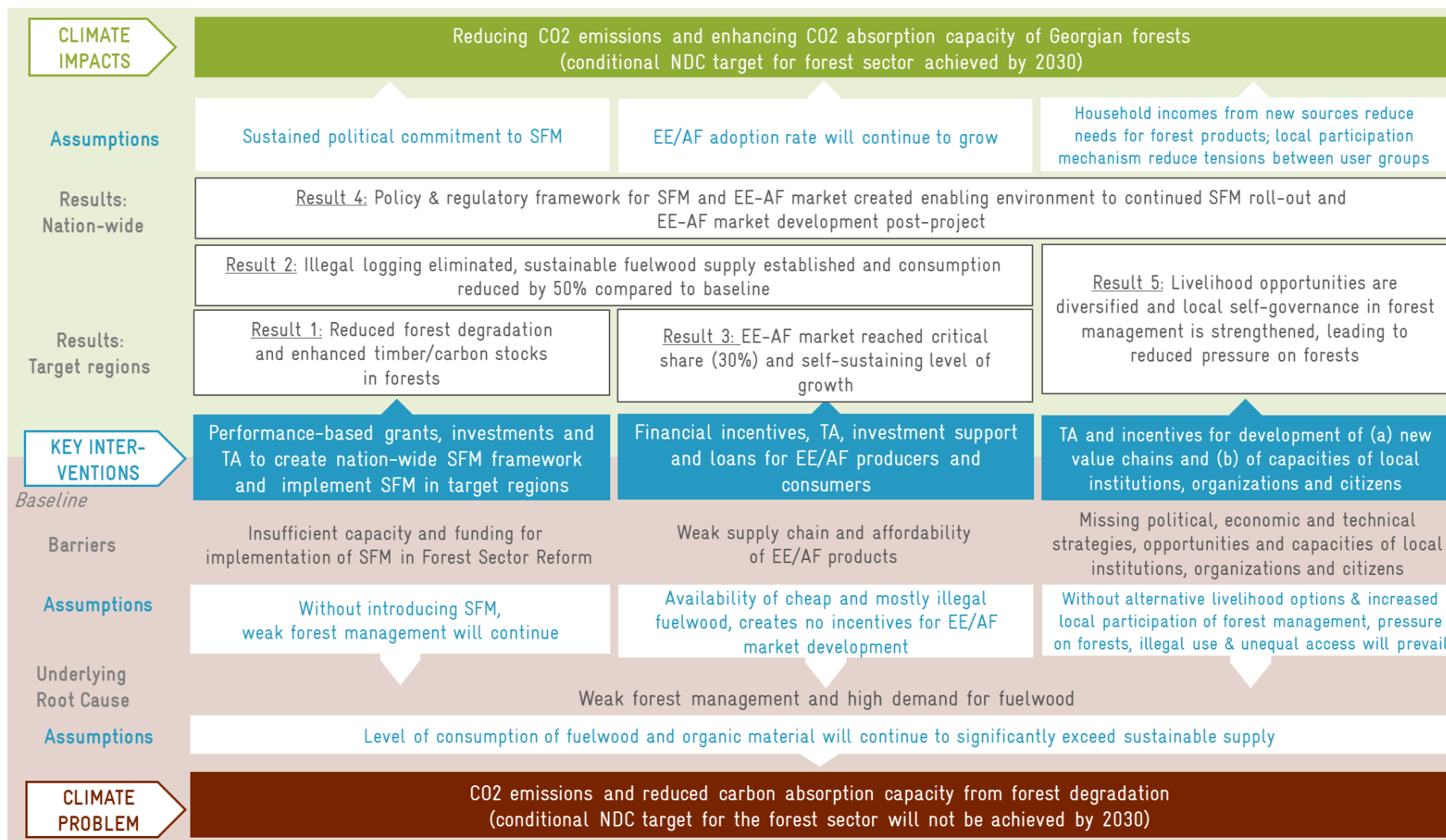


Figure 75: Theory of change

Component 1 carries a dual objective and works at two level. First it supports NFA to implement SFM in line with NDC target in three target regions, while in parallel it works with NFA, other forest management bodies, forest supervision and MoEPA to create enabling environment, capacities and sustainable financing mechanism for SFM nation-wide.

Similarly, under Component 2 the primary focus will be on the population of the target regions to be first affected by the Forest Sector reform and therefore the first to demand EE-AF products. At the same time, to ensure sustainability and scaling-up EE-AF market, the project will at the national level support policy, regulatory, and investment framework for EE-AF sector in partnership with EE-AF suppliers, financial sector and the Government.

The focus of Component 3 will be on municipal institutions, policies and the population in the three target regions. These communities will be among the first to be affected by the implementation of the new forest management regime in the country.

The project Components 1,2 and 3 are inter-dependent and complementary and reinforce the outcomes of each other, as illustrated in the Figure below. On one side, addressing the root cause of forest degradation, i.e. unsustainable fuelwood consumption, is made possible by providing affordable and more efficient alternatives to current stoves thus reducing by at least 50% the demand for fuelwood from households and consequently the pressure on forest. On the other side, introduction and strict enforcement of SFM practices along with new business model for supply of sustainably harvested and quality fuelwood provides strong impetus for the growth of EE-AF market because the abundant supply of illegally sourced fuel will gradually phase out. Component 3 ensures that the gradual transition to the new forest management system is socially just and provides employment and income opportunities for forest adjoining communities.

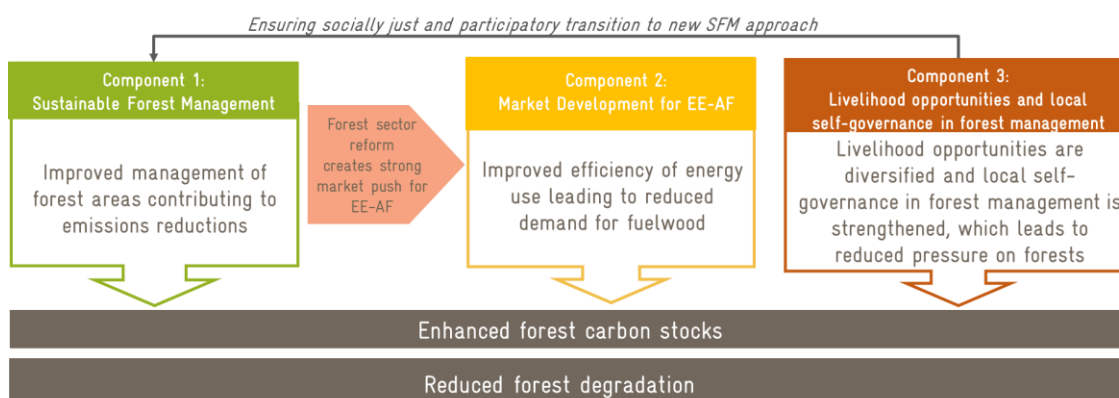


Figure 76: Complementarity of project objectives

As an overarching financing framework for GCF project implementation, the Georgia Forest and Rural Energy Investment Facility (GFREIF) will be formed to coordinate and scale-up public and private investment in low-carbon transformation of Georgia's forestry and rural energy sector. In line with proposed two-pronged approach, the Facility will consist of two funding windows (see also Figure 87 below).

Under the GFREIF Public Investment Window, the Facility will establish a sustainable financial mechanism to channel public investment in Sustainable Forest Management (SFM) by creating a viable business model for sustainable biomass supply to consumers and a revolving financing scheme to enable accumulation of NFA revenues and their re-investment to scale-up SFM across Georgia. A performance-based GCF investment grant will be used to kick-start and initiate SFM implementation in three target regions of Georgia, and, via technical assistance, to build the capacity of NFA to roll-out SFM to other forest districts across the country. The Public Investment Window will become self-sustainable from year 15 of reformed NFA operations. Sustainability of the GFREIF Public Investment Window will be ensured by the NFA financial independence from the state budget and earmarking its revenues for re-investment in SFM implementation across the country

The GFREIF Private Investment Window will facilitate private investment in the forestry and rural energy sector. It will do so by providing a range of de-risking instruments in the form of technical assistance (TA), grants, interest rate subsidies and guarantees to be deployed alongside market loans by the Georgian commercial banks. The following private investments will be supported and de-risked: a) investment in domestic EE-AF production and supply chain; b) Providing private forestry service companies with investment capital to carry out SFM works; and c) Investment by households and other fuelwood users in EE-AF solutions. GCF grant resources, along with BMZ co-financing in the form of TA, will be used to design and operate de-risking instruments in a more targeted, efficient and result-oriented manner (e.g. only producers of appliances which meet EU Eco-design standards will be eligible to be supported).

De-risking instruments such as interest rate subsidies and guarantees will be co-financed by the Government and financial partners. To ensure sustainability of the GFREIF Private Investment Window SIDA will provide co-financing to mainstream de-risking instruments in the ARDA core activities, along with capacity building for ARDA and its partner banks to implement and expand the scope of support to cover other EE-AF solutions for rural areas. A limited amount of GCF funds (less than 10%) will be used to provide financial incentives via a result-based grant voucher scheme to households to jump-start demand for EE stoves and enable rapid growth and capitalization of this new market segment.

6.2 Project's approach to address barriers

As described in the previous chapters, there are various barriers that limit the adoption and scaling up of SFM, as well as energy efficient technologies and alternative fuels. The project follows a two-pronged approach to address prevailing barriers to SFM and EE-AF market development: Component 1 aims at operationalizing and scaling-up implementation of SFM, while Component 2 – at stimulating EE-AF market growth, specifically for rural areas. Table 57 summarizes how sector-specific barriers (identified in Chapter 5) will be addressed:

Table 57: Overview of barriers to transition to SFM and EE-AF sector development and the project's approach to address them

Main Barriers	Approach to address barriers by the project
Incomplete, unreliable and outdated data on forest inventories	
<ul style="list-style-type: none"> Outdated forest inventories, limited knowledge about the actual state of forested areas.⁴⁶⁴ In majority of the target districts, the date of the last inventory is within the range of 1987 to 1995.⁴⁶⁵ Limited information on climate risk and vulnerability, and suitable adaptation strategies for forest ecosystems in the target regions. 	<ul style="list-style-type: none"> FMPs and forest management inventories (based on the revised Regulation 179) will be elaborated for 4 districts (Activity 1.1).⁴⁶⁶ FIMS module development to be supported, resulting in the operationalization of 8 modules that improve forest information, monitoring, and evaluation, enabling active management and improved learning in the sector (Activity 1.5) Trainings will be conducted on best practices for conducting forest management inventories, writing FMPs based on SFM, in particular ecosystem-based forest management practices, and regulatory changes associated with the forest code, and on key considerations for the revision and approval of FMPs (Activity 1.1) Assessment of climate risk and vulnerability and suitable adaptation strategies for the three project regions, where there are currently no comparable studies. Information will then be mainstreamed into FMPs, annual plans, manuals, guidelines and protocols. It will further inform the national dialogue on adaptation in forested ecosystems (Activity 1.4)
Current forest utilization practices have led to unsustainable forest management practices and forest degradation, including the overharvesting of forest resources (esp. fuelwood), among others	
<ul style="list-style-type: none"> Unsuitable and unsustainable business as usual (BAU) forest management practices have contributed to degradation, and the maintenance of poor-quality degraded forests. E.g. Timber extraction without considering low impact logging has contributed to forest degradation. Poor management has resulted in degraded, 	<ul style="list-style-type: none"> Promotion of best practices relevant for the Georgian context, which specifically address problems associated with BAU practices (e.g. low-impact logging, grazing control, climate-resilient forest infrastructure construction, among others; Activity 1.1). Examples of such practices include: restoration of low quality and degraded stands by using natural regeneration and/or enrichment planting with site-adapted native species, including consideration of controlled grazing in management plans, executing maintenance felling in appropriate situations where quality needs to be improved, implementation of low impact logging and many others. These practices are coherent with the management-level criteria and indicators for ecosystem-based

⁴⁶⁴ Patarkalshvili 2016; NFA 2019.

⁴⁶⁵ Information provided by NFA, Forest Fund Single Inventory Data Indicators [unpublished].

⁴⁶⁶ One of the four FMPs in our target districts that are already under development – Akhmeta - will follow a new standard of systematic sample plot assessment forest inventories developed with GIZ support in the context of the design study for the national forest inventory and forest management inventories. For the three other FMP projects the inventory work is done already following the existing Reg. 179. Forest management inventories will be supported in the other 4 districts where there are currently no forest management plans.

Main Barriers	Approach to address barriers by the project
<p>low quality forests with low levels of timber production and the declined function of other key ecosystem services.</p> <ul style="list-style-type: none"> Currently training within the forestry sector is handled by each institution, and is fragmented and often comprised of “one-off” trainings that are organized by each institution. While such trainings have provided important knowledge and strengthened capacities, they limit knowledge retention on the trained topics to only those who participated in the training. This is particularly worrisome considering the need to develop substantial capacities to implement and scale up SFM, and especially ecosystem-based forest management practices Insufficient cross-sectoral coordination has limited the development of joint initiatives to tackle cross-cutting topics such as fuelwood, energy efficiency, alternative fuels and rural development, among others Poorly constructed forest infrastructure and under-investments in the sector limit forest management, and ultimately the competitiveness and profitability of the sector.⁴⁶⁷ E.g. investments in roads have been very limited, and majority of forest roads are poorly constructed dirt roads that are highly prone to erosion and damage.⁴⁶⁸ Forest roads are often not usable for most of the year due to their poor condition. 	<p>forest management, developed by the Government of Georgia (see Chapter 5.2 for a description of BAU challenges and promoted ecosystem-based management practices).</p> <ul style="list-style-type: none"> Training on financial and economic planning for the forest sector under SFM, in particular ecosystem-based forest management, and marketing of wood resources (Activities 1.1 and 1.3). Development of business plans for forest districts, to strengthen financial and economic planning, whilst ensuring sustainable management in the long-term. Phasing down of fuelwood will be supported by Component 2 of the project that promotes energy efficiency and alternate fuels. In addition, improved management planning as well as financial and economic planning will help ensure that sustainable business models and plans are developed for business service yards in each district (that are aligned with FMPs and business plans developed in Activity 1.1). Development of training modules on necessary topics to support the implementation of ecosystem-based forest management (using different modes such as e-courses, classroom trainings, in-forest trainings). Topics can include ecosystem-based forest management practices for low-impact logging and cutting operations, low-impact resilient forest infrastructure construction, among others (described in further detail in the Activity descriptions below). Trainers within government institutions will be trained to facilitate knowledge retention and continued capacity development within institutions (Cross-cutting within Component 1). Development of a knowledge management and training platform, to institutionalize trainings and strengthen knowledge management (Activity 1.4.3). Support to the development of FIMS to improve activity tracking in the sector, strengthening information collection and monitoring to inform adaptive management (Activity 1.5) Support to the implementation of the upgraded NFP process, including multi-stakeholder working groups and annual plenary meetings. A high-level government working group will be further established to promote improve coordination and coordination (Activity 1.4). <p>Ensure adequate investments are made in target districts to promote a paradigm shift towards forest restoration, the enhancement of carbon stocks and ultimately ecosystem based forest management in the forest sector (Activity 1.1).</p> <ul style="list-style-type: none"> Investments to include repairs to existing infrastructure (e.g. roads), and will be targeted to ensure that more sustainably constructed and resilient infrastructure based on international best practices yet well-suited to

⁴⁶⁷ World Bank 2018.

⁴⁶⁸ Patarkalshvili 2016.

Main Barriers	Approach to address barriers by the project
	the local context are constructed (Activity 1.1). The network of forest access roads will be increased, to ensure implementation of SFM (see Chapter 5.2.3.4 for more information on benchmarks and investment needs). Given needs to rapidly expand the road network, the project will support NFA to improve both planning, and construction of low-impact and resilient forest infrastructure.
Operational and legal restrictions limit the ability to benefit from SFM, in particular ecosystem-based forest management	
<ul style="list-style-type: none"> Existing legislation (Secondary Legal Acts 241, 242, and 179) has gaps in regard to ecosystem-based forest management implementation (i.e., inventory planning and implementation, zoning, and forest maintenance measures). Collection of non-timber forest resources is only permitted for personal use, whereas the commercial use of non-timber forest resources is currently not regulated 	<ul style="list-style-type: none"> While GIZ has committed to support the revision of regulations 179, 241 and 242 once the forest code is approved, additional support will be provided in case any additional regulatory changes are required to enable the operationalization of ecosystem-based forest management (fixing gaps/ inconsistencies in the regulatory framework; Activity 1.4) Additionally, regulation on the commercial use of non-timber forest resources will be drafted to cover key topics including: types of non-timber forest resources that can be commercially harvested, amounts for each NTFP that can be commercially harvested to ensure sustainable management based on ecosystem-based forest management, fees for commercial harvesting, processes for commercial harvesting (applications, forms, monitoring, timing / zones, among others). Revision of secondary legal acts to support compliance with the new forest code (specifically resolutions 241, 242, and 179; Activity 1.4) Elaboration of a new secondary legal act for the commercial use of non-timber forest resources to comply with the new forest code (Activity 1.4)
Insufficient capacities and finance to implement alternative fuelwood and timber supply mechanism in NFA-managed forests	
<ul style="list-style-type: none"> While the concession system and ‘social cut program’ are being phased out, the Government of Georgia needs to develop a new mechanism for the sustainable provision of fuelwood and timber. While a concept exists, construction on the first business service yard has only begun in 2019. In the project region alone, at least 15 yards are needed. In addition, there are currently no standard operating procedures and limited existing capacities on the operation of ‘business service yards’. 	<ul style="list-style-type: none"> Establishment of a fuelwood and timber provision mechanism managed by NFA and marketed through business service yards, improving traceability and transparency in these value chains (Activity 1.1, 1.3 and 1.5). Technical support for building capacities to operationalize the new business service yard system (i.e. wood provision mechanism), including supporting the elaboration of SOPs capacity development, and providing ongoing technical assistance on the operation of BSYs (incl. value adding opportunities, best practices, transparent monitoring [linked with MRV and electronic timber tracking system], and long-term sustainable financial and economic planning; Activity 1.3). Development of training modules on the marketing of fuelwood and timber products, and operation of BSYs, and trainings provided to regional and district-level NFA staff, including trainers within NFA (Activity 1.3).

Main Barriers	Approach to address barriers by the project
<ul style="list-style-type: none"> ▪ Limited capacities in NFA on marketing and commercial aspects related to BSY and fuelwood provision ▪ Lack of awareness on the new fuelwood provision mechanism since the concept has yet to be implemented. Local people are aware that the social cutting program is being phased out, however there is limited awareness of the BSY concept. 	<ul style="list-style-type: none"> ▪ Provision of ongoing technical assistance to the NFA to strengthen financial and economic planning to support the sustainable long-term provision of timber and fuelwood from their forests based on SFM, in particular ecosystem-based forest management (Activity 1.3; Activity 1.1). ▪ Raising of awareness together with municipalities and local NGOs on the country's forest sector reform, including the new fuelwood mechanism (Activity 2.3). ▪ Reduction in demand for fuelwood through investments in energy efficient technologies and alternative fuels (Component 2), closing the gap which leads to the unsustainable and largely illegal harvesting of fuelwood.
Insufficient forest supervision	
<ul style="list-style-type: none"> ▪ Weak standard operating procedures mean that the application of the law is up to the discretion and interpretation of patrollers and inspectors that may result in the inconsistent application of the law and regulations.⁴⁶⁹ ▪ Lack of a standardized training system results in a variety of trainings (in terms of topics and quality of trainings), especially at the sub-national level. Lack of standard training modules on international and national best practices, which ultimately contributes to limited staff capacities. ▪ Weak capacities of staff on various topics related to improved forest supervision incl. knowledge on best practices for patrolling and inspection ▪ State budget only covers basic equipment (uniforms, radio communication, etc.),⁴⁷⁰ and there are insufficient resources to invest in additional technology that 	<ul style="list-style-type: none"> ▪ Elaboration of harmonized standard operating procedures based on best practices, and train all staff on these procedures. This will help limit discretion in forest inspectors and patrollers' actions, and ensure best practice measures are adopted. SOPs and procedures shall reflect regulatory changes associated with the adoption of the new forest code (Activity 1.2). ▪ Preparation and institutionalization of training modules for DES staff on key topics including SOPs, best practices for forest patrolling and forest inspection,⁴⁷¹ and equipment and technology for improved forest supervision and law enforcement (Activity 1.2). A knowledge management and training platform will be established at EIEC, to improve knowledge management, dissemination and capacity development for forest sector stakeholders, including DES (Activity 1.4). ▪ Ensures permanent training systems are established that facilitate the development of DES staff capacities based on a standardized systems that promotes best practices and strengthened knowledge management (Activity 1.2 and 1.4). ▪ Procurement of equipment (combined with trainings on new technology and best practices for forest supervision) in technology that will improve forest supervision (video cameras along forest roads in hotspot areas, drones for detection of illegal activities, Activity 1.2)

⁴⁶⁹ Morciladze, and Bularga 2005; Stakeholder consultations held for proposal preparation.

⁴⁷⁰ List provided by DES highlighted that majority of their Budget was dedicated to staff costs, as well as the purchase of uniforms, flashlights, truncheons, rescue vests, fire extinguishers, vehicles, flasher lights, among other standard equipment. DES's Budget also covers laboratory surveys, office expenses, fuel and maintenance expenses of fleet of cars, vehicle and (partial) personnel insurance costs, and the construction of an office building in Kutaisi.

⁴⁷¹ Ensure that the environmental awareness of staff, pertaining to SFM, is strengthened to promote the implementation of the liability law, new forest code and secondary legislation.

Main Barriers	Approach to address barriers by the project
<p>would greatly improve forest supervision (incl. cameras on forest roads, drones for detection of illegal activities, etc.). Such technology will improve the monitoring of forests and potential hotspots of illegal activity, improved control of forest roads and transportation of timber.</p> <ul style="list-style-type: none"> Gap in Electronic System of Timber Resources Management with the Revenue Services System that inhibits the tracking of timber from sawmills to the consumer/ buyer. 	<ul style="list-style-type: none"> Support to FIMS will include support to improve the Electronic System of Timber Resources Management, including addressing the gap with the Revenue Services System, ultimately improving traceability and transparency in the sector (Activity 1.5).
Inadequate financing for the forest sector	
<ul style="list-style-type: none"> Insufficient government budget to invest in sufficient BSYs (15 for the project region). There is a need to roll out BSYs across the country given the high-reliance on fuelwood in rural areas, and the phasing out of the ‘social wood program’. Under-investment in the sector has created a vicious cycle of inefficient production, low-quality production and thus targets low-priced markets, ultimately preventing the sector’s profitability.⁴⁷² 	<ul style="list-style-type: none"> Co-investments will be made in BSYs in target districts to serve as model yards for the provision of fuelwood (Activity 1.3), based on economically-environmentally and socially-sustainable business models (the latter developed Activity 1.1). Government contribution will cover 50% of costs, and the grant will ensure that suitable and realistic equipment and structures are developed that support the long-term investment perspective of BSYs. Co-investments in implementing SFM, especially ecosystem-based forest management practices, on 270,807 ha in 8 target districts that result in the reduction of GHG emissions through reducing forest degradation, and enhancing forest carbon stocks. Government contribution will cover 50% of the costs. (Activity 1.1). Co-investments in improving forest supervision through investments in equipment and technology for improved patrolling and inspection (Activity 1.3). Investment support scheme (financed by the Government of Georgia) for forest service contractors via interest rate subsidies through the existing ARDA investment support programme (Activity 1.1)
Under-developed supply chain for EE technologies and alternative fuels	
<ul style="list-style-type: none"> Producers are restricted in their ability to raise capital in order to invest in expansion of production and distribution capacities, as well as in supply of raw materials (in case of USB producers). 	<ul style="list-style-type: none"> The project will facilitate creation and expedited growth of the supply chain for EE and low-carbon AF solutions via Activity 2.1 consisting of two complementary sub-activities: <ul style="list-style-type: none"> Sub-activity 2.1.1 Establishing Technical Assistance and Investment Support Facility, TAISF (ARDA) Sub-activity 2.1.2: Feasibility assessment and pipeline development for new EE-AF solutions (GIZ)

⁴⁷² World Bank 2019

Main Barriers	Approach to address barriers by the project
<ul style="list-style-type: none"> ▪ Quality issues and absence of testing and certification services ▪ Entrepreneurs involved in USB supply chain are lacking detailed information on availability and territorial distribution of raw materials, as well as expertise to conduct such resource assessment and develop feasible business models 	<ul style="list-style-type: none"> ▪ Sub-activity 2.1.1 will focus on the two existing EE-AF supply chains: energy efficient stoves (solid fuel-based space heaters) and USB. In parallel, Sub-activity 2.1.2 will support identification and feasibility assessment for other EE-AF alternatives for which the supply chain does not yet fully developed in Georgia, e.g. thermal insulation of houses.
Affordability of EE/AFs to consumers, especially for poor households	
<ul style="list-style-type: none"> ▪ High up-front costs of energy efficient technologies is a major barrier to their wide-spread adoption by households, which is being further exacerbated by low level of incomes in rural Georgia and households' restricted access to bank financing 	<ul style="list-style-type: none"> ▪ A targeted consumer financing scheme and incentives will be established under Activity 2.2 to address this barrier. The Project will, in partnership with national financial organizations, local banks and MFIs, provide a package of consumer financing options focusing initially on EE stoves and USB (Sub-activity 2.2.1 and 2.2.2), but gradually expanding to other more sophisticated EE-AF technologies (Sub-activity 2.2.3). The objective of this Activity is to jump-start the market and to significantly scale-up demand for EE-AF products (EE stoves and USB) in target regions. It is also meant to provide meaningful and practical alternative to the population of the regions, which will be the first to be affected by the forestry sector reform, reduced availability /higher price of the fuelwood (Component 1).
Low consumer awareness about technologies and fuel alternatives and reduction of fuel wood consumption	
<ul style="list-style-type: none"> ▪ Awareness about energy efficiency and sustainable/low-carbon alternative fuels is very low among rural Georgian households: only 20% of the local population are aware about energy efficiency, while the rest of rural residents are either not sure or not aware at all. ▪ Population is also concerned about availability and potential disruption and instability of AF supply to rural areas 	<ul style="list-style-type: none"> ▪ To address this barrier, the project under Activity 2.3 will provide extensive community-based informational and technical advisory support to fuelwood users in the target regions and other locations across rural Georgia. This support will specifically cover a) provision of information about locally available EE-AF solutions; b) outreach and awareness raising about the implications of the forestry sector reform on fuelwood availability, price and available EE-AF alternatives, new supply chain of fuelwood via NFA, as well as c) provision of technical advisory services to fuelwood users to help them identify and apply optimal EE-AF solutions in their households. This activity will involve close collaboration with regional and municipal authorities, trustees of the local communities, community-based organizations (CBOs), women groups and local NGOs.
Absence of enabling policy and regulatory framework	

Main Barriers	Approach to address barriers by the project
<ul style="list-style-type: none"> ▪ Slow progress and insufficient capacities in the Government to effectively transpose and implement relevant provisions of the EU <i>energy aquis</i> in the areas of energy efficiency and alternative fuels, specifically: <ul style="list-style-type: none"> - Regulations which establish minimum allowed level of energy efficiency and environmental performance for domestic appliances, in particular heat stoves; - Roadmap and capacities for introduction of EE labelling for heat stoves; - Support and promotion scheme for renewable heat supply. 	<ul style="list-style-type: none"> ▪ Technical assistance will be provided under Activity 2.4. to the relevant public authorities to accelerate transposition and practical implementation of those policy and regulatory instruments envisaged in EU <i>energy aquis</i>, which have direct relevance and implications for the EE-AF sector and reduction of the fuelwood consumption in rural areas, namely: <ul style="list-style-type: none"> - Sub-activity 2.4.1: Capacity building for introduction and enforcement of energy efficiency and environmental standards and labelling for EE stoves to enable gradual phase out of low-quality inefficient appliances from the market and stimulate market demand for EE appliances - Sub-activity 2.4.2: Facilitating introduction of EE procurement practices in public sector to create demand for EE appliances and alternative fuels in public sector buildings.
Absence of strategies, tools, instruments and capacities for municipal authorities to participate in sustainable forest management and conservation	
<ul style="list-style-type: none"> ▪ The new Forest Code (article 20 and 21) foresees in the medium- to long-term the optional management of forests by municipalities. However, this concept is at a very nascent stage in Georgia. For the time being, most municipalities lack a strategic approach, practical instruments and tools, economic and technical planning, awareness and human skills and capacities to actively engage in sustainable forest management as stipulated in the new Forest Code. 	<ul style="list-style-type: none"> ▪ Preparation of framework conditions and introduction of municipal sustainable forest management in the country. ▪ Development and Introduction of tools, practices, plans and economic planning instruments specifically designed for utilisation in municipal forest management and conservation efforts. ▪ Conduct capacity development for municipal authorities that will enable staff and community members to utilize the developed instruments and to participate in management and conservation activities. (Activity 3.1)
Insufficient participation and representation of local stakeholders in forest management related decision-making	
<ul style="list-style-type: none"> ▪ To date, participation in e.g. FMP-development is implemented on a very basic level without providing sufficient opportunities for local stakeholders to participate in decision-making or to benefit from forest management plan implementation. The Forest Sector Reform foresees intensive stakeholder engagement, 	<ul style="list-style-type: none"> ▪ To overcome this barrier, Activity 3.2 will put the new participation approach into “life”, acknowledging the need for conflict resolution mechanisms. To do so, the project will develop, promote and test interest protection mechanisms. The grievance mechanism developed for this project will serve as a starting point for one of the mechanisms.

Main Barriers	Approach to address barriers by the project
<p>when planning and implementing SFM. However, existing mechanisms or instruments are insufficient to materialize this approach nor is an awareness or capacities in local communities available to participate in potential mechanisms.</p>	
Lack of qualified personnel and insufficient education opportunities in the forest sector	
<ul style="list-style-type: none"> ▪ The implementation of the Forest Sector Reform will require a large number of new forest workers to be employed either in NFA or in private sector companies. Moreover, the introduction of forest-related value-chains will further require organizational and business skills related to production, processing and marketing of forest products. VET colleges lack capacities, equipment, curricula and educated teaching staff to expand their already existing program. Moreover, forest related education programmes at universities need improvement in terms of curricula strengthening, expansion of research activities and building up networks with international research and university institutes. 	<ul style="list-style-type: none"> ▪ To diversify income opportunities, the project will work with vocational training colleges to strengthen the educational capacities of the institutions, to foster intake of local community members and to promote the forest worker job profile in the three target regions (Activity 3.3). ▪ At university level, practically relevant research activities and forester education will be supported by establishing partnerships with international qualified centers of knowledge to efficiently build up necessary expertise and solutions in the respective forester education programmes.
Under-utilisation of economic opportunities in forest-related value chains	
<ul style="list-style-type: none"> ▪ Forest-related value chains such as timber value chain, Non-Timber-Forest Products (NTFP) value chains and eco-tourism opportunities offer potential income sources for local communities. The economic, but ecological sustainable utilization of these value chains is below the potential. Reasons include lack of data, sector analyses for the identification of economic opportunities, lack of business plans and strategies, missing human, technical and economic capacities and capital. 	<ul style="list-style-type: none"> ▪ To address this barrier, the project will create alternative livelihood opportunities for individuals and households in the target regions (Activity 3.4) to <ul style="list-style-type: none"> - support the transition from informal fuelwood related income sources of certain members of the community to other (more formal) sources of income, and thus compensate for loss of (informal) income sources caused by the Forest Sector Reform - increase household incomes, which eventually supports potential fuel switch and purchase of legal, high quality fuelwood

6.3 The project's facility approach

6.3.1 Why a facility approach was selected

When designing the project, the following options were considered for the structuring of the project, in particular related to financial management and coordination across sectors:

- **Option 1:** Establishment of two independent financial mechanisms, one for forestry, one for energy.
- **Option 2:** Establishment of a facility containing the two mechanisms. This would facilitate strong coordination between the mechanisms, however no funds would flow between the two mechanisms.
- **Option 3:** Establishment of a new fund (as an institution), where revenues flow in and will be utilized in both sectors.

Option 1 would have resulted in the creation of two independent, self-sustaining mechanisms, however a weakness is the lack of coordination among the two approaches. Given the importance of improving harmonization between the energy and forestry sectors, a challenge noted in the previous Chapter, this option was not preferred.

Option 2 considers the need for improved coordination across the energy and forestry sectors, and would facilitate coordination between the two mechanisms. It would however, allow funds to be managed separately for each mechanism.

Option 3 would result in the creation of a new fund (as an institution), which was discussed in terms of ensuring financial sustainability. However, it was decided that Option 3 was not suitable for the project due to the following reasons:

- The establishment of a new fund would make sense in the case where the fund finances activities beyond sustainable forest management to target community-based drivers such as agricultural encroachment by farmers/communities, which require a shift of agricultural practices to avoid deforestation, or to tackle the poverty driven over-use of forests (both of which are not the case in Georgia). In addition, livelihood and rural development support activities are already covered by other funds or funding mechanisms (see FS Section 6.5 for more detailed information on synergies with other government initiatives).
- For the sustainable forest management activities (core implementation activity in our proposal – see Component 1 in the following sub-section), the sole revenue “generator” is NFA, mainly via timber and fuelwood sales. The sole beneficiary of the re-investment of the revenues would also be NFA. A lean “in-house re-investment” approach has therefore been developed, where NFA re-invests its revenues in the implementation of SFM measures. NFA will receive TA to setup its business plans and investment plans and to increase their planning and economic management capabilities (part of Activity 1.1.).
- Past experience with the establishment of special purpose funds in Georgia has not been positive, and there was resistance by the Government, especially the Ministry of Finance, to set up a new special purpose funds. The Ministry and GIZ have serious doubts that a Fund would receive governmental approval. It would require opening up well established institutional responsibility setups and budget flows. These discussions would take years, if at all allowed by government.

- Setting up a fund would require substantial resources and administrative capacities. These would have to be set up from scratch and would lead to high transaction costs for implementation (financing of mechanisms, structures, staff etc.). Budget which would be missing for implementation of concrete measures.
- A fund, which generates revenues in the forest sector and provides funding in the rural energy/rural development sector (i.e. a fund basically covering the two sectors) would lead to a risk of opening the fund flow to other sectors, which are not of relevance for rural energy and forestry.

Thus, it was decided that it is most suitable to establish a facility, which facilitates improved coordination yet enables financial independence of the two mechanisms. It is seen as the most viable approach for project management in order to improve coordination across sectors, and facilitate long-term financial sustainability and ultimately a paradigm shift towards low-emission and climate-resilient development. The following sub-section describes the project facility design in greater detail.

6.3.2 Georgia Forest and Energy Investment Facility (GFREIF)

The Georgia Forest and Rural Energy Investment Facility (GFREIF) will be formed as part of the GCF-funded project to coordinate and scale-up public and private investment in low-carbon transformation of Georgia's forestry and rural energy sector. The facility will follow a two-pronged approach: First, it will establish sustainable financial mechanism to channel **public investment** in Sustainable Forest Management (**SFM**), while in parallel it will create new market opportunities and facilitate **private investment** in **forestry and rural energy** sector.

To do so, the Facility will consist of two complementary financial windows:

- a) Public sector window managed by the **National Forestry Agency (NFA)**; and
- b) Private sector window implemented by the **Agriculture and Rural Development Agency (ARDA)** in partnership with local banks and micro finance institutions

The Facility will be overseen by a high level sector coordination committee, consisting of representatives of the forestry, rural development and energy sectors (see Activity 1.4.2 in Chapter 6). The project implementation unit will supplement the coordination committee in fulfilling its oversight function.

GFREIF Window 1: Public Investment

Under the public sector window, the Facility will create a viable business model for sustainable biomass supply to consumers and a revolving financing mechanism to enable accumulation of NFA revenues and their re-investment to scale-up SFM across Georgia.

Role of GCF: A performance-based GCF investment grant will be used to kick-start and initiate SFM implementation in three target regions of Georgia, and, via technical assistance, to build the capacity of NFA to scale-up SFM to other forest districts across the country.

Sustainability and scaling-up: Window 1 has been designed to become self-sustainable and from year 15 of reformed NFA operations to provide sufficient capital to enable SFM implementation at scale. The Law of Georgia on Legal Entities of Public Laws provides for financial independence of NFA and enables NFA to generate and retain own funds through the activities relevant to their mandates. Based on this, the Charter of NFA has been approved by the Minister of MEPA which enlist eligible activities for NFA to generate income (special cut, rent for mobile antennas, etc). Further, those eligible revenue-generating forest management activities are defined in the Resolution of the Government of Georgia (GoG) N242. NFA's revenues shall be accumulated at the special account opened in the State Treasury and re-investment to scale-up SFM made based on annual Procurement Plan to be approved by the MEPA and the Government of Georgia. (See also financial analysis and projections for NFA operations in Annex 3b of the FP and the paper "Exit strategy and up-scaling approach GCF Georgia").

Management: The window will be managed by the NFA department responsible for strategic planning, business plan development and investment management. Technical assistance will be provided to strengthen these management capacities of NFA.

GFREIF Window 2: Private investment

Under the private sector window, the Facility will provide through the Technical Assistance and Investment Support Facility (TAISF) of ARDA a range of de-risking instruments in the form of technical assistance (TA), grants, interest rate subsidies and guarantees to be deployed alongside market loans by ARDA partner banks. ARDA already has well established de-risking investment support instruments, which so far have been targeting the agricultural sector but with their new mandate are now open to rural development and rural energy. The following private investments will be supported and de-risked in the course of the GCF project:

- Investment in domestic EE-AF production and supply chain;
- Providing private forestry service companies with operational capital to carry out SFM works;
- Investment by households and other fuelwood users in EE-AF solutions.

Role of GCF: GCF grant resources, along with BMZ and SIDA co-financing in the form of TA, will be used to design and operate de-risking instruments in a more targeted, efficient and result-oriented manner (e.g. only producers of appliances which meet EU Eco-design standards will be eligible to be supported). A limited amount of GCF funds (less than 10%) will be used to provide financial incentives via a result-based grant voucher scheme to households to jump-start EE market and enable its rapid growth and capitalization. Other de-risking instruments such as interest rate subsidies and guarantees will be co-financed by the Government and financial partners.

Sustainability and exit strategy:

Exit strategy for the GFREIF's Private Sector window is based on empowering and capacitating ARDA to become an effective paying agency for public de-risking instruments for private investment in forestry, rural energy and agricultural sector. With SIDA co-financing ARDA's capacities to design, implement and embed such instruments in its programming framework will be enhanced. As regards financial incentives for households, the need for them will discontinue once EE-AF market reaches maturity and economy of scale, as has also been widely evidenced in OECD/EU countries adopting similar consumer-support schemes for EE appliances (see page 265 in FS).

Management: The TAISF is situated in ARDA and will consist of ARDA management/accounting staff, technical and financial consultants and dedicated GIZ staff.

Figure 77 below provides an overview of the Georgia Forest and Rural Energy Investment Facility.

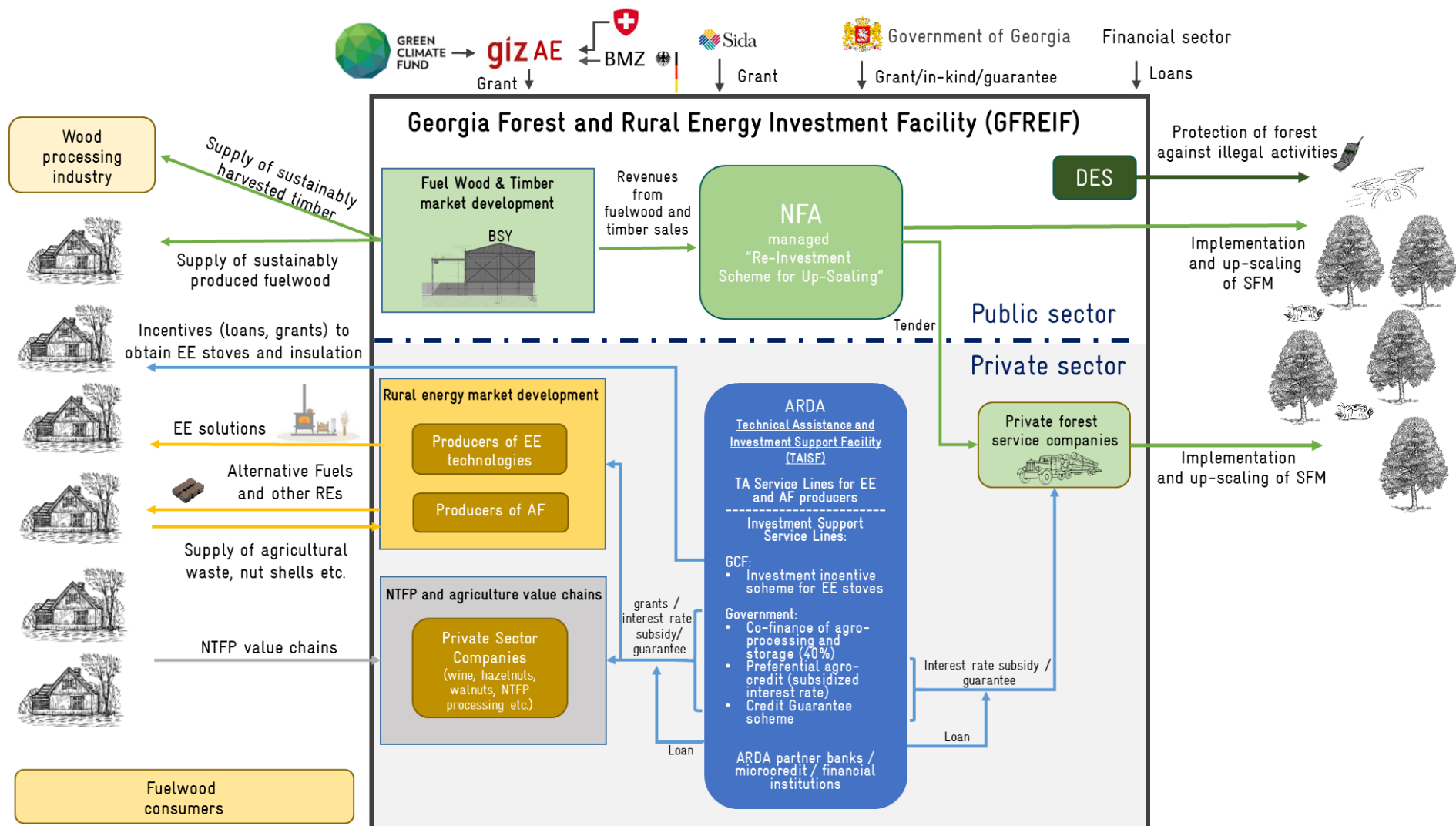


Figure 77: Overview of Georgia Forest and Rural Energy Investment Facility

6.4 Project structure and description

The overall project structure is presented in Figure 78. An overview table with the selection of appropriate instruments (technical assistance and financing instruments) applied in the project per activity and the justification for their application is provided at the end of this chapter.

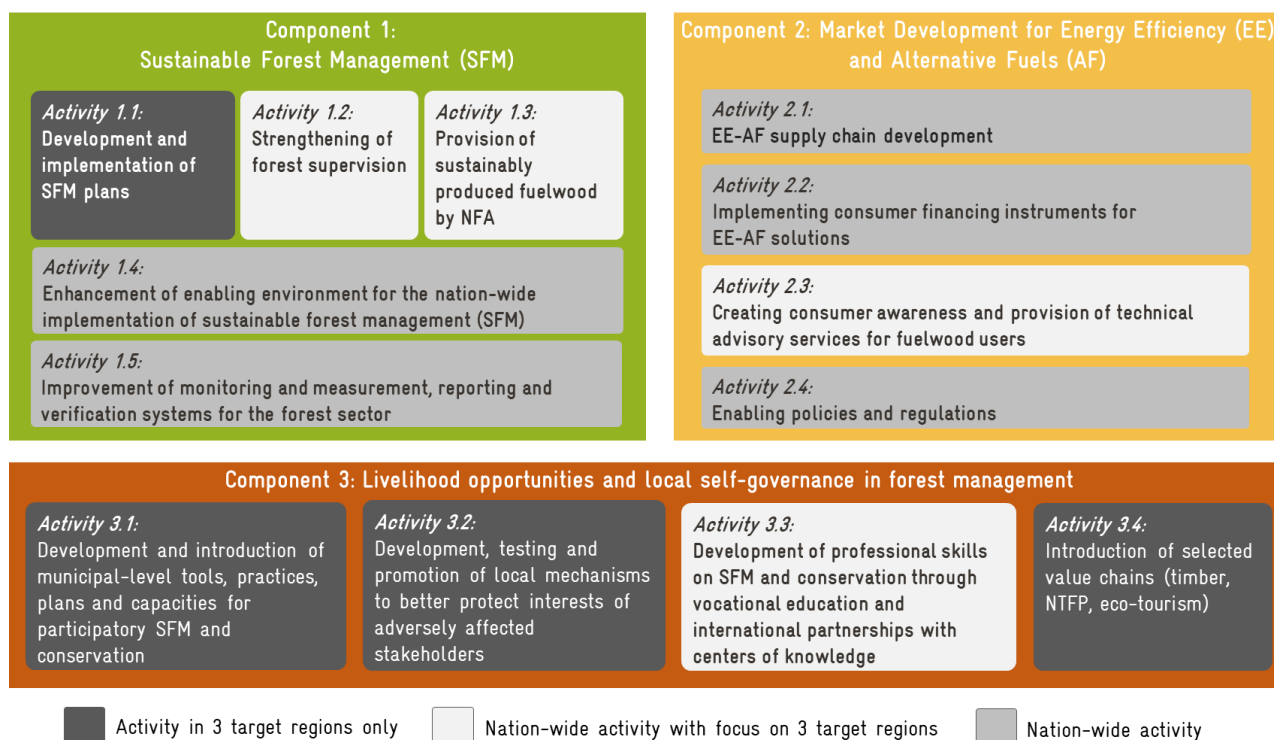


Figure 78: Project structure

6.4.1 Component 1 Sustainable Forest Management

This component focuses on two intervention levels to address the above-mentioned barriers to SFM:

- On the national level, the project supports the establishment of an enabling environment for the nation-wide rollout of sustainable forest management as defined in the new forest code. This includes supporting the elaboration of secondary legal acts to comply with the new forest code, improving knowledge management, vocational education and training, and cross-sectoral coordination in the sector, strengthening forest supervision under the Department of Forest Supervision, building capacities of government institutions and private sector actors, and developing a forest information and monitoring system, among other measures.
- At the regional level, the project will support the implementation of SFM, in particular ecosystem-based forest management, on 270,807 ha, exceeding the conditional NDC target set by the Georgian government. The implementation of SFM will be in the three target regions of Kakheti, Guria and Mtskheta-Mtianeti, specifically within 8 districts (see Chapter 4 for more detailed information on target district selection). It will further support the implementation of a new fuelwood provision mechanism in these districts, to facilitate the sustainable production and marketing of legally harvested fuelwood (i.e. a sustainable fuelwood supply chain) and timber.

6.4.1.1 Activity 1.1 Development and implementation of sustainable forest management plans

Activity 1.1 Development and implementation of sustainable forest management plans									
Contribution to GCF outcome(s)	M9.0 Improved management of land or forest areas contributing to emissions reductions								
Contribution to project output	Sustainable forest management is implemented on 270,807 ha								
Description of sub-activities	For NFA-managed forest lands, NFA is obliged to develop and implement forest management plans following secondary legal acts/ regulations. The draft new forest code has a stronger emphasis on sustainable forest management, as described in Chapter 5.2. ⁴⁷³								
	The project supports eight forest districts within the three target regions (Kakheti, Guria and Mtskheta-Mtianeti) to implement SFM, in particular ecosystem-based forest management, on 270,807 ha. The management will be based on the new forest code, and related secondary legal acts. The secondary legal acts will be revised to reflect the new forest code as well as National Principles, Criteria and Indicators for SFM, and Management-level Criteria and Indicators for Ecosystem-based Forest Management. ⁴⁷⁴ The adoption of SFM will help to reduce greenhouse gas (GHG) emissions through enhancing forest carbon stocks, and reducing forest degradation. It will also strengthen the resilience of forest ecosystems to climate change.								
	The activity is comprised of the following sub-activities:								
	<u>Sub-activity 1.1.1 Development of forest management plans based on the principles of SFM in selected forest districts</u>								
	Forest management plans, based on revised secondary legal acts related to forest management, will be developed in four of the target districts where there are currently no FMPs (see Table below). ⁴⁷⁵								
	<i>Table 58: Status of FMPs in target districts</i>								
	<table><tr><th>Region</th><th>Target districts with approved or nearly approved FMPs by project start⁴⁷⁶</th><th>Target districts to be supported with FMP development</th></tr><tr><td rowspan="2">Guria</td><td>1 Lanchkhuti (Under development, to be approved by late 2019)</td><td rowspan="2">0</td></tr><tr><td>1 Chokhatauri (Under development, to be approved by early 2020)</td></tr></table>	Region	Target districts with approved or nearly approved FMPs by project start ⁴⁷⁶	Target districts to be supported with FMP development	Guria	1 Lanchkhuti (Under development, to be approved by late 2019)	0	1 Chokhatauri (Under development, to be approved by early 2020)	
Region	Target districts with approved or nearly approved FMPs by project start ⁴⁷⁶	Target districts to be supported with FMP development							
Guria	1 Lanchkhuti (Under development, to be approved by late 2019)	0							
	1 Chokhatauri (Under development, to be approved by early 2020)								

⁴⁷³ Forest code is expected to be approved in autumn 2019. See Activity 1.4 for a description of the project's support for the revision of select acts, and Annex 2 for a detailed description of the main secondary legal acts that need to be revised under the forest code.

⁴⁷⁴ Once the new forest code is approved, related secondary legal acts will be revised and/or elaborated to ensure their compliance with the forest code. GIZ will support the elaboration of the three legal sub-acts that are the most relevant for forest management plan development, forest inventory, restoration, management and utilization (currently Resolutions 179, 241 and 242 of Government of Georgia), and it is expected this work will be initiated prior to project start – as soon as the new code is approved.

⁴⁷⁵ Eight project districts have been selected, as described in Section 2 of the Feasibility Study, including 3 in Guria (Lanchkhuti, Chokhatauri, Ozurgeti), 4 in Kakheti (Akhmeta, Telavi, Kvareli and Dedoplistskaro), and 1 in Mtskheta-Mtianeti (Tianeti).

⁴⁷⁶ Described in the respective legal acts (with FMPs approved or close to approval in 2019 or early 2020).

		1 Ozurgeti (Under development, to be approved by early 2020)	
	Kakheti	1 Akhmeta (under development, to be approved by early 2020)	1 Telavi 1 Dedoplistskaro 1 Kvareli
	Mtskheta-Mtianeti	0	1 Tianeti

The development of sustainable FMPs involves the following (*anticipated*)⁴⁷⁷ core steps:

1. Stakeholder meeting to inform of upcoming FMP development
2. Mapping of forest zones based on forest functions
 - a. Preparation of field work
 - b. Implementation of forest function mapping and zoning
 - i. Including field work, as well as consultation with stakeholders as a basis for mapping of forest zones (incl. discussions on livelihood activities such as grazing, recreational use, NTFP collection etc.) Final mapping and land use analysis (after ground truthing)
3. Forest inventory
 - a. Sample-plot based forest inventory combined with stand descriptions. This will result in statistically-sound district-level data on forests
 - b. Based on the field work results, measures for the next 10 years period are proposed.
4. Preparation of 10-year forest management plans

Development of 10-year management plan based on the stand-wise planning and the sample-plot based forest inventory, and consultation with municipalities, local communities and other stakeholders

 - a. FMP will include the final definition of measures on stand and management unit level, incl. among others
 - i. Business plan for SFM
 - ii. Harvesting plan according to assortment of timber qualities (including fuelwood)
 - iii. Plan of other silvicultural measures
 - iv. Forest protection plan, including fire prevention and disease control
 - v. Forest Pasture management plan
 - vi. NTFP harvesting and management plan
 - vii. Planning of other special forest use activities
 - b. The documentation of stakeholder meetings will be provided along with the FMP.

⁴⁷⁷ These steps have been identified using current Resolution 179 (The Rule of Forest Registration, Planning and Monitoring), and through the inclusion of additional adjustments that are expected once the new forest code is approved (based on consultations, and literature review). Once the forest code is approved, subsequent regulatory revisions will ensure the compliance of key regulations, incl. 179, 241 and 242, with the new forest code, and further the alignment of these resolutions with the national and management-level criteria and indicators approved by the Government. The project will follow the regulatory requirements outlined in Resolution 179 at the time of the project, and thus it is possible some changes in the proposed sub-activity could occur that are not foreseen.

- c. The approval of forest management plan (as described in Article 15 within the current version of Resolution 179)⁴⁷⁸
 - i. Disclosure period (20 days) for stakeholders to provide final comments
 - ii. After disclosure period ends, the management authority will have 15 working days to consider the submitted feedback, and document how it has been integrated/ addressed, or if not why.
 - iii. Affirming authority (MoEPA-BFD) will either affirm the management plan or return it back to the management authority with remarks within a period of ten days.⁴⁷⁹

Given the need to invest in substantial roads and infrastructure, road planning specialists will be hired to support NFA to design the forest access road network.

Stakeholder engagement during the FMP process:

The new (draft) forest code states: *“Stakeholders have the right to participate in the decision-making process pertaining forest management, where the identity and culture of communities residing in the vicinity of forests as well as traditions of forest management should be considered.”* Thus, the proposed process includes additional measures aimed to improve stakeholder engagement and consultation within the FMP development process. It is envisaged that stakeholder engagement will be conducted in three main phases: i) at the beginning of FMP development to inform stakeholders of the FMP development process, receive early feedback and define participation of stakeholders in the FMP development, ii) in the middle of the process to discuss and provide feedback on local use of forest, zoning considerations and to plan for multi-purpose forest management based on local feedback, and iii) to validate the FMP. Project management staff, NFA staff, and a community participation facilitator (as defined in ESMP, Annex 6b to the Funding Proposal) will engage closely with communities and other local stakeholders to build capacities related to SFM, particular the multifunctional use of forest ecosystems, and new opportunities for stakeholder engagement, and local input and opportunities to support FMP development and implementation.

Technical support and trainings:

Ongoing technical support for FMP development will be offered for NFA staff and forest-sector contractors through: (1) technical staff provided by GIZ, (2) the support of international and national experts, and (3) targeted trainings (outlined in Table 59). Trainings will be designed in a way that they support best practices for Georgian conditions and focus on the institutionalization of knowledge and strengthened capacities. Training modules will be developed by international and

⁴⁷⁸ Note: Resolution 179 will be revised to ensure its compliance with the New (draft) forest code that is to be accepted in mid-2019. The implementation of this activity will be based on the revised regulation and slight revisions may occur.

⁴⁷⁹ For more detailed information refer to Resolution 179.

national experts with the support of the Bavarian Forest Service,⁴⁸⁰ and other institutions/ organizations.⁴⁸¹ Occupational health and safety, gender, and practices to reduce environmental and social impacts (e.g. training on critical flora and fauna/ habitat, etc.) will be cross-cutting elements in training modules. Trainings will be designed using a variety of training formats (e-courses, office trainings and in-forest trainings). This will support existing staff and private sector employees to adopt the new forest code and promote sustainable forest practices that are aligned with SFM for early adoption of such practices. Such trainings will involve the development of training modules that allows for future replication, and potential integration into forestry courses within the vocational education system (Activity 1.4 describes the project's efforts to strengthen vocational education in the forestry sector in Georgia).⁴⁸² Training materials will be integrated into an online knowledge management and training platform, which will include e-learning elements, videos, knowledge storage, and ultimately strengthen the management and dissemination of information (see Activity 1.4 for more information on the platform).

To the greatest extent possible, the project will support the training of trainers in country to implement the trainings to promote knowledge retention and management within national institutions and colleges (embedment into the education and training system of Georgia). However, for some activities especially related to in-forest and highly technical trainings, international and national experts as well as members of the Bavarian Forest Service⁴⁸³ will be recruited to support with module development and training implementation.

Table 59: Planned training modules under sub-activity 1.1.1

<i>Training Module</i>	Training format	Target audience
Data collection for Forest Management Inventories (FMIs) and planning for SFM ⁴⁸⁴	E-course, in-office and in-forest trainings	NFA trainers (i.e. staff within NFA responsible for training), Staff from NFA Forest Use and Regional Development Department, NFA Inventory and Reforestation Department, NFA Regional Forestry Services in Target Regions, forest sector contractors

⁴⁸⁰ A MoU was signed between LEPL "National Forestry Agency" and "Bavarian State Forest" Cooperation in the field of forestry on September 22, 2016. It specifically states that "The Parties shall promote bilateral cooperation in forestry development of the states in accordance with applicable law; this MoU within the framework of cooperation with the aim of: to exchange information and share experience in the field of forestry, such as the forest inventory and planning, forest management and climate change, techniques and wood harvesting methods, forest pests and diseases in order to eliminate consultancy; coaching or consulting on agreed shared projects; cooperation in education and training", among others.

⁴⁸¹ Cooperation with Slovenian Forest Experts has been initiated in recent years. The Government of Georgia is in the process of developing a MoU with the Slovenian Forest Service to provide targeted technical support for the forest sector.

⁴⁸² It is unclear under the new (draft) forest code what is meant by "formal qualifications". For trainings where a certificate is needed, VET colleges will provide the trainings. For staff trainings where no formal qualification/ certificate from the Ministry of Education is provided, trainings will be conducted at NFA offices by qualified trainers (to the greatest extent by training NFA trainers).

⁴⁸³ Other stakeholders, such as the Slovenian Forest Service, may also be involved.

⁴⁸⁴ It will build on FMI training modules developed by GIZ in 2018/9, integrating in regulatory changes once the forest code is approved and related regulatory revisions made.

	SFM: implications for the revision and endorsement of FMPs ⁴⁸⁵	E-course and in-office trainings	Staff from MoEPA Biodiversity and Forestry Department
	Business Plan Development to support FMP elaboration and implementation, and business service yard operations and planning	E-course, in-office trainings	Head of NFA, NFA Deputy Heads, Staff from NFA Inventory and Reforestation Department, NFA Forest Use and Regional Development Department, NFA training pool; Regional NFA Forestry Services Staff (3-4 representatives per region – head of service, chief forester, forest operations managers)
	Long-term financial planning for NFA to roll-out SFM based on sustainable utilization and strategic planning	In-office training, on-the job training/ technical support	Head of NFA, NFA Deputy Heads, NFA Department heads, Staff from NFA Financial Department, NFA Inventory and Reforestation Department, and NFA Forest Use and Regional Development Department
	Climate change: ⁴⁸⁶ risks for Georgia's forests and best practices for climate-resilient SFM.	E-course	All technical staff from NFA, MoEPA Biodiversity and Forestry Department

Sub-activity 1.1.2 Implementation of forest management plans in selected forest districts

The project will support the implementation of 8 endorsed FMPs in the target districts. This includes the preparation of annual action plans (Under Article 29 of the new forest code). Such plans will be elaborated based on approved FMPs, and the C&I and regulatory framework described above. They will provide a detailed description of the measures planned for a 1-year period. Examples of potential forestry measures are described in detail in Chapter 5.2, but include, among others:

Table 60: Examples of potential forestry measures (See Chapter 5.2 for more info)

Examples of Measures	Brief Description
Planning and implementation of regeneration and restoration activities	<ul style="list-style-type: none"> Forest regeneration through the facilitation of natural regeneration. At least 80% of regeneration should be through natural regeneration (as per the Management-level C&I for Ecosystem-based Forest Management – see Chapter 5.2) In instances where natural regeneration is not deemed suitable, based on approved FMPs and Annual Action Plans, enrichment planting using locally-adapted native species may be used.

⁴⁸⁵ This module will be developed to build capacities in MoEPA's Biodiversity and Forestry Department on SFM, and key considerations for the ministry to enhance the FMP revision and endorsement process. The training module will help ensure FMPs are fully aligned with SFM, and to support the future training of division staff on the FMP process, particularly revision and endorsement.

⁴⁸⁶ Climate change risk reduction and improving climate-resilient forest management will be cross-cutting through all trainings.

		<ul style="list-style-type: none"> Potential measures include, for instance, the restoration of low quality and degraded stands (including forests with different functions – production, protection, etc., as identified within FMP), combining: enrichment planting with native, site-adapted and climate-resilient tree species of the respective natural forest type, promotion of natural regeneration, grazing control (e.g. fencing, “social fencing”), weeding and early (selective) maintenance where necessary, among other activities.
	Planning and implementation of cutting operations including maintenance and final cutting operations	<ul style="list-style-type: none"> Low-impact cutting operations, where useful, will promote the development of natural forest types with high quality timber, resilient forest structures, without weakening the natural dynamics and potential of the forests. Conducted using low-impact logging, which will be implemented by a combination of: improved forest access systems, optimal harvesting techniques (incl. “<i>adapted harvesting systems</i>” for mountainous conditions), and improved capacities of forest workers, among other improved practices.
	Promotion of sustainably planned and resilient forest infrastructure	<ul style="list-style-type: none"> Considered a pre-condition for sustainable forest management, especially given challenges with accessibility in Georgia. Infrastructure will be planned within FMPs to facilitate SFM, ensuring low-impact and resilient construction that is well planned (including support for building capacities for planning, construction and maintenance). The improvement of existing skidding lines and roads have preference, and construction will ensure that they are built in a manner that is “landscape oriented” with the lowest amount of environmental impact. Regular maintenance of this infrastructure is necessary and planned to prevent their degradation, erosion and ultimately maintain accessibility to facilitate SFM.
<p>*Note: All implemented measures will be based on approved FMPs and Action Plans, and further aligned with the national legal and regulatory framework. See Chapter 11 for a discussion on risks due to potential differences between the forest model and actual forest conditions.</p> <p>While FMPs and annual plans cover the entire NFA-managed forest land in each district (a combined area of 270,807 ha), it is expected that active interventions (e.g. forest infrastructure construction/ maintenance/ improvements, harvesting, reforestation, cutting operations, etc.) will be implemented on only 58% of the area (157,359 ha in total; see Chapter 5.2.3.4 for more detailed information on the specific areas and activities). The remaining area (113,448 ha, equivalent to 42% of the area) will be managed with lower intensity (minimal or no interventions) to prevent environmental damage, preserve ecosystem functions (incl. protection functions, among others), enable recreation activities, among other activities. This includes the:</p> <ul style="list-style-type: none"> Preservation of reference forest areas, to enable the analysis of natural forest dynamics, and to learn from these areas (e.g. comparing with managed areas)⁴⁸⁷ 		

⁴⁸⁷ Management level C&I for ecosystem-based forest management emphasize the importance of maintaining ‘unmanaged reference areas.’ (Criterion 4). Currently there is no provision in Resolutions 241 or 242. The thematic topics for indicator formulation presented in the C&I

- Conservation of protection forests (e.g. buffer areas along bodies of water, forests on slopes above 35°, among others)⁴⁸⁸
- Conservation of forest areas in higher altitudes (above 2,000m)⁴⁸⁹
- Recreation forests

In addition, some forests will remain inaccessible due to the lack of forest access roads and skidding trails.

Monitoring of implementation of forest management plans will utilize aerial and terrestrial forest monitoring methods and activity recording, and will be based on the monitoring approach described in the approved FMP and annual use plans (this will be closely linked with monitoring and MRV (e.g. data collection, reporting, etc.), described in Activity 1.5).

Overview of technical assistance:

Technical support will be provided to NFA staff, and forest-sector contractors to develop capacities on best practices for implementing SFM. This includes dedicated project management staff, and national and international experts (remote sensing, biodiversity, environmental scientists, economists, etc.) to provide targeted support where needed for the implementation of SFM. This includes on-the-job training, the development of guidelines and protocols for the implementation of best practices for SFM, and the development of training modules, training of trainers and conducting trainings.

Both short-term trainings and longer-term vocational education and training will be supported by the project. Short-term trainings are needed for existing and newly hired NFA staff to enable the adoption of best practices for SFM. Extending vocational education will be critical to support the training of future forest workers. It is further necessary to ensure the training and qualification of existing forest staff, as Article 86 in the new forest code requires all foresters and forest workers to demonstrate they have successfully completed education qualification requirement by the end of 2025. According to the Article, a person may be a forester if he/she holds a respective university degree in the field of forestry (at least a bachelor's degree) and a forest worker if he/she has a relevant professional qualification. If the person employed fails to demonstrate that they have met this obligation, it will result in the termination of their contract. Vocational education is addressed in Sub-activity 1.4.4.

- *Short-term skills development trainings:* To support the implementation of Activity 1.1.2, training modules will be developed in a manner that improves knowledge retention and dissemination for NFA and private sector contractors (together with Activity 1.4.3). Training modules for a variety of relevant subjects will be developed by national and international experts, with technical guidance and oversight from NFA and GIZ. Training modules will include diverse materials and training approaches, including e-learning (e-courses,

note that “[4.1] reference areas shall represent the main natural forest types in the region, characterizing the given forest” and “[4.2] reference area should not be smaller than 100 ha”.

⁴⁸⁸ Exceptions may be made in degraded areas where the protective function of forests can be enhanced (based on FMPs and annual action plans).

⁴⁸⁹ Again, exceptions may be made based on forest management inventories and corresponding FMPs and Annual plans if interventions are deemed necessary (e.g. in areas at risk of forest fire, degraded areas, etc).

videos online, guidelines online), office/ classroom training, and in-forest learning. Each training module will be integrated into the knowledge management and training platform (elaborated in Activity 1.4), which will help store and disseminate knowledge. Table 61 provides a summary of key short-term trainings envisioned within Sub-activity 1.1.2. Occupational health and safety, gender and practices to reduce environmental and social impacts will be a cross-cutting theme across all trainings.

Table 61: Planned training modules for sub-activity 1.1.2

Training module	Training format	Target audience
New roles and responsibilities of NFA, Standard Operating Procedures (SOP) and guidelines for operationalizing SFM	E-course, in-office trainings	All of NFA
Training of trainers to train regional forestry services: New roles and responsibilities of NFA, SOPs and guidelines for operationalizing SFM	Training of trainers to conduct in-office trainings	NFA trainer pool
Training of trainers on key trainings and themes for ecosystem based SFM: timber harvesting, sorting and storing, construction and maintenance of resilient infrastructure, forest regeneration and restoration under ecosystem-based SFM	In-office and in-forest trainings with an e-learning component	NFA trainer pool
Forest cutting (maintenance and final cuts) for ecosystem-based SFM	E-course, in-office training, in-forest training	NFA Forest Use and Regional Development Department, NFA Inventory and Reforestation Department, NFA Regional Forestry Services in Target Regions, Private Service Providers/ Contractors
Construction of sustainable and resilient infrastructure for ecosystem-based SFM	E-course, in-office training, in-forest training	NFA Forest Use and Regional Development Department, NFA Inventory and Reforestation Department, NFA Regional Forestry Services in Target Regions, Private Service Providers/ Contractors
Forest regeneration and restoration under ecosystem-based SFM	E-course, in-office training, in-forest training	NFA Forest Use and Regional Development Department, NFA Inventory and Reforestation Department, NFA Regional Forestry Services in Target Regions, Private Service Provides/ Contractors

To the greatest extent possible, the project will support the training of trainers in country to implement the trainings to promote knowledge retention and management within national institutions and colleges. However, for some activities especially related to in-forest and highly technical trainings, international and national experts will be recruited to support with module development and training implementation.⁴⁹⁰

Planned Staff Capacities and Equipment: NFA: As described in Chapter 5.2.3.5, currently NFA does not have sufficient capacities “in house” to independently implement forest management based on the approved FMPs. They currently plan to carry out 30% of management activities themselves, in order to be able to swiftly react to emergencies (calamities, forest fires, etc.) and to have experienced work force for highly demanding forest works that requires top quality and experienced staff.

The proposed NFA forest works field team structure per target region is described in Chapter 5.2.3.4-3.⁴⁹¹ Detailed equipment lists per team are provided in the Forest Model spreadsheet⁴⁹² and project’s budget. It represents an improved team structure, which divides the main management and use activities into targeted teams that allows for activity specialization, and improved efficiency. Nonetheless, capacities are low and there is a need for trainings on SFM, in particular ecosystem-based SFM (trainings described above).

Private Service Providers/ Contractors: While NFA is in the process of building up their own capacities and increasing their team, for the project duration it is anticipated that 70% of management work will be contracted out to private service providers. Private sector expertise and teams required for the implementation of SFM in the target districts is described in Chapter 5.2.3.4.3.

After contracting, short-term trainings will be provided for private sector service providers to enable the adoption of SFM for project implementation (see table above). Longer-term trainings and certificates for private sector actors is also supported by the project through vocational education in Activity 1.4.

Overview of financial instruments:

- *Performance-based grant to NFA for implementation of FMPs (GCF-financed):* based on the progress in FMP implementation, the project will provide a 50% contribution in year 1, 3 and 5 to the procurement of advanced, low-impact SFM machinery and low-impact and resilient forest road construction. To minimize concessionality requirements, this investment support will be in the form of performance-based grants and linked to the achievement by the NFA

⁴⁹⁰ The National Forest Agency has signed a Memorandum of Understanding (MoU) with the Bavarian Forestry Service which will facilitate knowledge exchange, and the provision of staff to conduct trainings. The Government is also in the process of negotiating a MoU with the Slovenian Forest Service.

⁴⁹¹ Originally, it was planned to have six people teams with only 2 chainsaws per team, and second-hand old Soviet vehicles (log trucks, off-road trucks), which not only have high maintenance costs but also are damaging to poorly constructed forest roads. These teams were envisioned to be responsible for management/ maintenance, harvesting, road building and transportation. However, during project preparation it was discussed that such a set up will greatly limit the implementation, and ultimately the efficiency and effectiveness of SFM. Thus, an improved team structure, and revised equipment list were developed.

⁴⁹² Available upon request.

	<p>of the agreed-upon milestones related to forest road construction, harvesting, planting, etc. in the FMPs (see Chapter 5.2.3.4 and Appendix 4 for detailed specification of equipment and works).</p> <p><i>Interest-rate subsidies and guarantees to private sector forest contractors via ARDA (Government-financed):</i></p> <ul style="list-style-type: none"> ARDA will provide, an interest rate subsidy and a guarantee scheme (jointly with a range of partner banks) via its existing investment support instruments for the agricultural sector (see Activity 2.1 and Chapters 7 and 8 for more details). Together with long-term contracts provided by NFA this support scheme will stimulate investment of the private sector into modern equipment.
Implementation mechanisms	<ul style="list-style-type: none"> The implementation of this Activity and its Sub-activities will be led by NFA, particularly the Forest Inventory and Reforestation Department; and Forest Use and Regional Development Department, and NFA Regional Services. GIZ will provide technical assistance for the implementation of this Activity. Close coordination will be sought with the implementation of the other activities within Component 1, and the responsible institutions (MoEPA/BFD, DES, EIEC, etc.). E.g. BFD is responsible for the approval of FMPs.
Fund flow arrangement	<p>GIZ AE will enter into a subsidiary agreement with NFA. The Subsidiary Agreement is legally binding and outline the detailed financial, procurement and implementation plan of the relevant elements of the project, incl. reporting and liability requirements.</p>
Budget and co-finance	<p>Total Activity Cost: approximately EUR 108.47 million</p> <ul style="list-style-type: none"> Total GCF finance to NFA and GIZ: EUR 14.17 million <ul style="list-style-type: none"> <i>GCF Investments: Investments in inventory equipment; investments in equipment for restoration and regeneration, harvesting, timber transport, for road construction and maintenance (co-investments); skidding roads construction (co-investments)</i> <i>Technical assistance: National experts for FMP development, development of training on regulatory changes; GIZ advisors and international and national experts for strategic planning, elaboration of guidelines, manuals, and training modules, knowledge exchange workshops on FMP development and implementation; stakeholder engagement events during FMP implementation at region level.</i> Co-finance Government: EUR 93.79 million (including NFA revenues of ca. EUR 84.7 million) Co-finance BMZ: EUR 0.50 million
Performance-based grant mechanism	<p>Performance-based grant mechanism</p> <p>SFM measures will be implemented by the NFA itself (ca. 30% of works) and by private sector forest service companies (sub-contracted by NFA, ca. 70% of the works). The performance-based grant mechanism provides financial assistance (9.6 million EUR GCF funding) to NFA to overcome severe constraints in financing the necessary investments in equipment and forest/skidding road construction, while at the same time provides assurance that established targets and milestones will be achieved. For each installment under the grant specific performance targets will be established in line with the project results framework. The</p>

allocation of next tranche shall be conditional upon achievement of the established targets and milestones.

The implementation of SFM measures increases gradually, i.e. starting from 19% capacity in year one to 100% in year seven to cater for a) the building up of capacities in NFA and the private sector and b) the timing to develop forest management plans in 4 of the 8 target districts.

Coverage and main principles of the mechanism:

- The mechanism only covers the 30% share of works performed by NFA itself, i.e. no GCF funding will be directly or indirectly provided to forest service companies (private sector). The 70% work share is mainly financed by future revenues generated from timber and fuelwood sales and to a small extend by state budget contributions.
- The mechanism covers a) purchase of equipment for the SFM measure implementation and b) forest and skidding road construction. The following equipment is eligible for the grant mechanisms to equip NFA teams:
 - Restoration and regeneration: ~6-7 teams per region (46 total) with 8 staff per team (368 staff total), plus an additional 8 teams for enrichment planning consisting of 2-3 teams per region, with 7-8 staff per team (60 staff total). Equipment needed includes off-road vehicles, soil drilling devices, and seed planting devices (per team). Within each region firefighting equipment is needed including water tanks, and a mobile fire extinguisher.
 - Cutting operations/ harvesting teams: 4-5 per region (13 in total), with 3 staff per team. Equipment needed includes additional modern chainsaws and harvesting tools, forest skidder with cable and crane systems, off-road cars, tree felling level, felling wedge and felling axe.
 - Transportation teams: 3-4 per region (10 teams in total), with 3 staff per team. Equipment needed includes off-road trucks and logging trucks equipped with loading cranes and GPS monitoring systems installed in trucks.
 - Forest access road and skidding trails building and maintenance teams: 2-3 per region (7 teams in total), with 3 staff per team. Equipment needed includes builders' levels, excavators, and trucks (per team). At the regional level there is the need to purchase 1 grader, 1 bulldozer and 1 road roller per region.
- GCF funding will only cover 50% of the respective equipment costs and forest/skidding road construction costs. The other 50% will be provided by the government/NFA as an indication of strong ownership by NFA.
- The mechanism does not cover any operations and maintenance costs. These will be covered by revenues generated.
- Sole grant recipient is NFA, the grant mechanism manager is GIZ Accredited Entity unit in Germany.

Grant proceeds:

- Based on the Forest Management Plans (FMPs) NFA defines the 10 year⁴⁹³ and annual targets for the SFM measures and forest/skidding road construc-

⁴⁹³ FMP planning horizon. Every 10 years a new FMP needs to be developed. Every year annual management plans have to be developed for each district.

	<p>tion in the respective forest districts. These targets follow the gradual implementation schedule (19% of the SFM measures in year one to 100% in year seven) in each district. Four FMPs will be available already at the beginning of the project, four additional ones will be available at end of year two.</p> <ul style="list-style-type: none"> • Based on the targets set in the FMPs, the investment needs in terms of teams and equipment as well as kilometers of road construction will be defined per target district. • In year one, the respective grant contribution of 50% will be transferred to NFA to tender the purchase of equipment. • End of year two the performance of NFA in terms of achieving the targets in SFM measures will be assessed and validated. In case the respective targets have been achieved, the 2nd tranche of grant support will be transferred to NFA in year three to a) expand the capacities for implementation in the first four districts and b) start implementation in the remaining four districts. • End of year four, the performance will be re-assed in all eight districts. In case of achievement of the results, the 3rd tranche will be transferred to NFA to enable 100% capacity for SFM measure implementation in all eight districts at the end of year seven. <p>The performance-based grant mechanism is depicted in the Figure on the following page:</p>
--	---

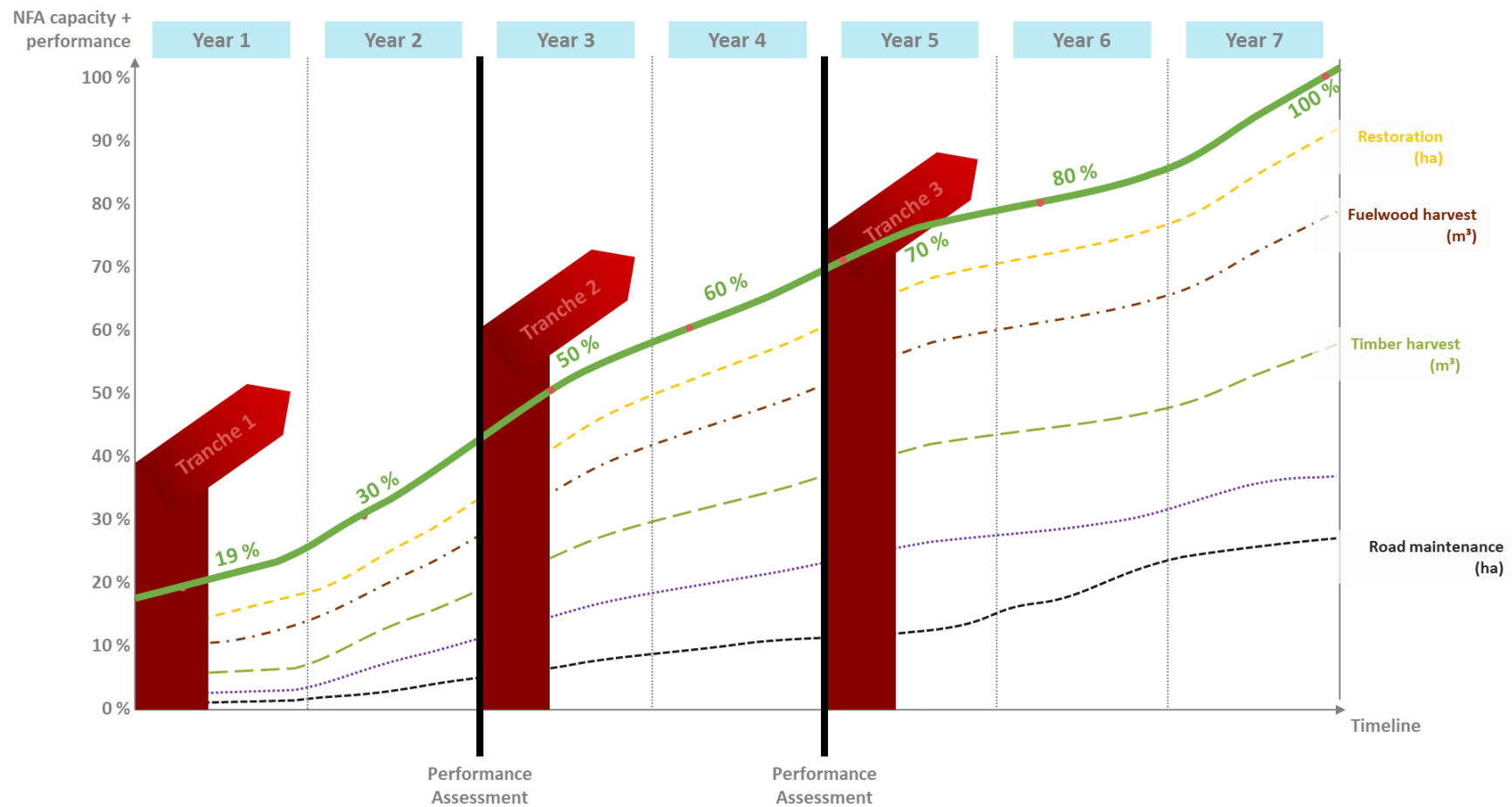


Figure 79: Overview of performance-based grant mechanism for NFA

6.4.1.2 Activity 1.2 Strengthening of forest supervision

Activity 1.2 Strengthening of forest supervision							
Contribution to GCF outcome(s)	M9.0 Improved management of land or forest areas contributing to emissions reductions						
Contribution to project output	Sustainable forest management is implemented on 270,807 ha						
Description of sub-activities	<p>This activity aims to reduce the unauthorized use of forested areas, including illegal logging for fuelwood and construction timber- key drivers of forest degradation and to control implementation of ecosystem-based forest management. It will achieve this through the following sub-activities:</p> <p><u>Sub-activity 1.2.1 Strengthening of procedures, standards and protocols for enhanced forest supervision</u></p> <p>Measures will focus on the national level, supporting DES to manage their new role under the country's forest reform and new forest code, as well as the regional level where support will focus on implementing enhanced forest supervision practices within three target regions. It includes:</p> <ul style="list-style-type: none"> Harmonization of new standards and systems for the newly established forest patrolling division with the standards and procedures for the already existing environmental patrolling division. Technical assistance will be provided to DES (through dedicated project management staff, as well as international and national experts) to support the harmonization of standards and systems including the development/ revision of standard operating procedures and guidelines for forest supervision and enforcement under the new forest code and liability law (both to be adopted in mid-to-late 2019), ensuring coherence with related revised secondary legal acts. While efforts aimed at harmonizing standards and training staff are ongoing since April 2019, additional support is needed to reflect forthcoming regulatory changes, and supporting staff awareness raising and training (considering the drastic increase in DES staff). E-learning elements will be supported by the project to enable information dissemination, knowledge retention, and institutional learning (see Training 1 in the table below). Development of at least five training modules by international and national experts in cooperation with national DES staff. This includes modules on: <p><i>Table 62: Planned training modules for sub-activity 1.2.1 and 1.2.2</i></p> <table> <tr> <th>Training Module*</th><th>Target Participants</th></tr> <tr> <td>Training of trainers to train regional forestry services: New roles and responsibilities of DES, SOPs and guidelines for operationalizing best practices for forest inspection and patrolling</td><td>DES training pool (8 trainers)</td></tr> <tr> <td>New DES SOPs, regulations and guidelines</td><td>Entire DES (in 2018 there were 411 men and women, however</td></tr> </table>	Training Module*	Target Participants	Training of trainers to train regional forestry services: New roles and responsibilities of DES, SOPs and guidelines for operationalizing best practices for forest inspection and patrolling	DES training pool (8 trainers)	New DES SOPs, regulations and guidelines	Entire DES (in 2018 there were 411 men and women, however
Training Module*	Target Participants						
Training of trainers to train regional forestry services: New roles and responsibilities of DES, SOPs and guidelines for operationalizing best practices for forest inspection and patrolling	DES training pool (8 trainers)						
New DES SOPs, regulations and guidelines	Entire DES (in 2018 there were 411 men and women, however						

		expected to increase to 870 men and women)						
	Best practices for forest patrolling (incl. the use of innovative technology and equipment, and related data analysis and tracking)	Forest patrols (306 men and women)						
	Best practices for inspection in the forest sector (incl. the use of innovative technology and equipment, and related data analysis)	Inspectors (30 men and women)						
	Best practices for conducting evaluations of damage imposed to forest ecosystems, and the identification of corrective and/or remedial measures ⁴⁹⁴	Inspectors (30 men and women concentrated in forestry)						
	Introduction to SFM, and regulatory framework to inform forest supervision (e-course)	Forest patrols and forest inspectors (336 men and women concentrated in forestry)						
<p>*Note: Trainings on the Forest Information and Monitoring System (FIMS), including modules for DES (e.g. Timber Tracking), are included in Activity 1.5 on monitoring and MRV.</p> <p>Cross-cutting themes within the training modules include gender, conflict moderation and occupational health and safety (incl. safety of forest patrols). Content of training modules will be overseen by DES in cooperation with project management staff, where module development will be supported by international and national experts. Training modules will support a “training of trainers” approach, with the aim to build up a training pool within DES (8 trainers will be trained on forest-sector specific themes). Logistics and coordination of trainings, quality control, and the integration of training modules into the knowledge management and training platform will be overseen by EIEC (Activity 1.4). Costs for the actual implementation of trainings 2-5 are included in in sub-activity 1.2.2.</p> <p><u>Sub-activity 1.2.2 Implementation of improved forest supervision measures and technologies</u></p> <ul style="list-style-type: none">Implementation of improved supervision practices through investments in improved technologies, equipment and vehicles for forest supervision: <p><i>Table 63: Equipment to be purchased under sub-activity 1.2.2</i></p> <table><tr><th>Equipment</th><th>How will this improve forest supervision?</th></tr><tr><td>Portable radio station, car radio station</td><td>Ensures communication with DES staff during working in time in forest districts without or with a weak mobile signal</td></tr><tr><td>All-terrain off-road vehicles (Bagi) and 4-wheel drive trucks for driving in mountainous/ forest areas.</td><td>Ensures movement in forest land (on high mountainous forest slopes) to improve response to detected offences. Currently DES has very few suitable vehicles that are able to reach these areas, greatly limiting the reach of forest supervision in these areas.</td></tr></table>			Equipment	How will this improve forest supervision?	Portable radio station, car radio station	Ensures communication with DES staff during working in time in forest districts without or with a weak mobile signal	All-terrain off-road vehicles (Bagi) and 4-wheel drive trucks for driving in mountainous/ forest areas.	Ensures movement in forest land (on high mountainous forest slopes) to improve response to detected offences. Currently DES has very few suitable vehicles that are able to reach these areas, greatly limiting the reach of forest supervision in these areas.
Equipment	How will this improve forest supervision?							
Portable radio station, car radio station	Ensures communication with DES staff during working in time in forest districts without or with a weak mobile signal							
All-terrain off-road vehicles (Bagi) and 4-wheel drive trucks for driving in mountainous/ forest areas.	Ensures movement in forest land (on high mountainous forest slopes) to improve response to detected offences. Currently DES has very few suitable vehicles that are able to reach these areas, greatly limiting the reach of forest supervision in these areas.							

⁴⁹⁴ This will build off of two trainings conducted for the EU program “Support to implementation of the Environmental provisions of the EU-Georgia Association Agreement “. Trainings will be conducted in November 2019 and June 2020 for the EU program, however the proposed GCF project will further support trainings that build on regulatory changes in the forest sector in 2020 (related to the new forest code and adjusted secondary legal acts), and will further focus on the institutionalization of trainings (e.g. training DES trainers, developing e-courses, integrating training materials, information and videos into the knowledge management and training portal – see Activity 1.4 for more detailed information on the knowledge management system).

	Camera traps, with automated transmission via GSM camera traps that are compatible with GSM operators in Georgia	Early experiences piloting/ implementing camera traps have shown their effectiveness when positioned in strategic areas to detect poachers, illegal loggers and other law violations. It further supports controlling access to forest roads and ultimately timber tracking.
	Drones	For rapid response to detect illegal activities and to strengthen monitoring and control over forest resources. ⁴⁹⁵
	Tablets with software downloaded (linked to FIMS Activity 1.5)	Software will be installed into the tablets that will support forest supervision. Software will provide information on where forest compartments are located, information on access roads to forests, information on FMPs, annual plans, activity recording, regulations for ensuring control, reporting and data collection on forest supervision (linked with FIMS), information on identifying illegally logged timber (incl. information on means for determining species and volume – including a photo feature), among other features.
	Cameras	Cameras to be provided so DES is able to document illegal activities, and environmental damage.
	GPS equipment for logging trucks	GPS equipment will be installed in registered logging trucks, and only registered trucks allowed. This will enable real-time tracking of logging trucks to improve timber tracking and establish clear chains of custody.
	<ul style="list-style-type: none"> ▪ Technical assistance (project management staff, international and national experts) to implement improved forest supervision practices, including the collection and analysis of improved information. ▪ Implementation of trainings for DES staff (trainings 2-5) 	
Implementation mechanisms	<ul style="list-style-type: none"> ▪ The implementation of this Activity and its Sub-activities will be led by DES. GIZ will provide technical assistance for the implementation of the Activity. Procurement will be done by DES. ▪ Close coordination will be sought with the implementation of Activity 1.5 (MRV), especially on topics related to the electronic timber tracking system and forest incidence monitoring, as well as general coordination and information sharing through FIMS and other related systems. Coordination with Activity 1.4 will be further ensured, particularly in relation to the revision of key legal sub acts, considering potential implications for forest supervision. 	
Fund flow arrangement	GIZ AE will enter into a subsidiary agreement with DES. The Subsidiary Agreement is legally binding and outlines the detailed financial, procurement and implementation plan of the relevant elements of the project, including reporting and liability requirements.	
Budget and co-finance	Total Activity Cost: EUR 5.54 million <ul style="list-style-type: none"> ▪ Total GCF finance: EUR 1.31 million 	

⁴⁹⁵ There are regulations for drones in Georgia that note that drones may only ascend to a height of 120m, they can only be operated within the direct line of site, if drones weigh over 5kg they must have permission from the National Aviation Authority, a distance of 50 m to people, roads, railways and buildings must be reserved, among others. Note: Permits are necessary for drone operation, however they are easy to obtain from the National Aviation Authority. DES has not had problems to obtain such permits in the past.

	<ul style="list-style-type: none"> ○ <i>Investments: Procurement of advanced equipment</i> ○ <i>Technical assistance: GIZ advisors, international and national expert to support harmonization of standards and procedures, SOP elaboration, elaboration of training modules, train trainers, DES training on harmonized standards and systems</i> ▪ Co-finance Government: EUR 3.79 million ▪ Co-finance BMZ: EUR 0.44 million
--	---

6.4.1.3 Activity 1.3 Provision of sustainably produced fuelwood by NFA

Activity 1.3. Provision of sustainably produced fuelwood by NFA	
Contribution to GCF outcome(s)	M9.0 Improved management of land or forest areas contributing to emissions reductions
Contribution to project output	Sustainable forest management is implemented on 270,807 ha
Description of sub-activities	<p>Phasing out the ‘social wood program’ by January 1, 2022,⁴⁹⁶ along with foreseen strengthened law enforcement to combat illegal logging (Activity 1.2), will support the transition to a new fuelwood provision mechanism overseen by the NFA that aims to provide sustainably produced fuelwood to local households. While the project also includes measures targeted at supporting energy efficiency and the transition to alternate fuels (Component 2), with 78- 90% of the rural population using fuelwood as either a supplemental or main energy source,⁴⁹⁷ fuelwood production will need to be ensured from sustainable sources while simultaneously supporting the phasing down of fuelwood use.</p> <p>Under the new forest code, NFA will be responsible for the provision of legally and sustainably sourced fuelwood in the country.⁴⁹⁸ A concept for the new fuelwood provision mechanism under the NFA has been drafted by the Government, as described in Chapter 5.2.3.⁴⁹⁹</p> <p>The project will support NFA in a) developing a new mechanism for fuelwood provision for the NFA managed forest areas (Business Service Yards) and b) implementing a model sustainable fuelwood supply chain in the three regions, sufficient to provide alternative supply of sustainably harvested timber and fuelwood (ensuring harvesting quantities that are directly linked to forest conditions, FMPs, and ultimately the national principles, criteria and indicators for SFM, as well as the Management-level C&I for ecosystem-based forest management). It will achieve this through the following sub-activities:</p> <p><u>Sub-activity 1.3.1 Support establishment of the new mechanism for fuelwood provision to local population</u></p> <p>This sub-activity supports NFA to establish a nation-wide mechanism for fuelwood provision to rural populations via business service yards. It includes:</p> <ul style="list-style-type: none"> ▪ The elaboration of standard operating procedures (SOPs), training modules⁵⁰⁰ and operational regulations, and technical guidelines for the newly established

⁴⁹⁶ Draft Forest Code, Version submitted to Georgian Parliament in February 2019

⁴⁹⁷ GIZ 2015; CENN 2016; USAID 2017;

⁴⁹⁸ Draft Forest Code, Version submitted to Georgian Parliament in February 2019

⁴⁹⁹ See Appendix 4

⁵⁰⁰ Training modules (incl. an e-course, training trainers, and regional BSY trainings conducted by NFA trainers) will be integrated in the knowledge management and training platform (Activity 1.4), where training materials, videos, protocols and other information will be stored and easily accessible.

	<p>BSYs to ensure their transparent, sustainable, and efficient operation. An additional training module will be developed on timber and fuelwood marketing to support NFA adapt to their new role in overseeing the fuelwood and timber provision mechanism via BSYs. The training will include a combination of online materials and classroom trainings.</p> <ul style="list-style-type: none"> ▪ The new mechanism for fuelwood provision envisions a proper assortment between high quality timber and poor quality timber directed for fuelwood. Current practice of producing fuelwood does not involve sorting high and poor quality timber. On-the-job trainings will be provided to the staff of BSYs by international and national experts and assortment operational guidelines will be developed for the on-the-ground BSY staff.⁵⁰¹ This will include trainings on sorting tree trunks into different qualities of timber to optimize the sale of higher-quality timber for higher prices, and ensuring that fuelwood is comprised of low-quality timber(to the greatest extent possible).⁵⁰² ▪ Cross-cutting themes within the training modules include gender, and occupational health and safety. Content of training modules will be overseen by NFA in cooperation with GIZ advisors, where module development will be supported by international and national experts. It will support a “training of trainers” approach, with the aim to build up a training pool within NFA, who will be responsible for conducting trainings for BSYs in each of the 9 regional units. Logistics and coordination of trainings, quality control, and the integration of training modules into the knowledge management and training platform will be overseen by EIEC (Activity 1.4). ▪ The provision of ongoing technical support by project management staff and experts to ensure effective controlling, and continuous improvement services to strengthen the operation and monitoring of BSYs. Such support is critical since the mechanism is new, and there is the need for adaptive management in the first years of operation. Areas of envisaged support include ensuring alignment of FMPs, business development plans and timber marketing at BSYs. ▪ Exchange meetings for DES, NFA and MoEPA to discuss lessons learned from the early implementation experiences of BSYs. Such meetings will ensure that early lessons learned are discussed to ensure adaptive management considering BSYs are a new concept in the country. ▪ Awareness raising on new fuelwood provision mechanism will be conducted in Activity 2.3. <p><u>Sub-activity 1.3.2 Establishment of business service yards (BSY)</u></p> <p>This action will support the establishment of 14 BSYs in the target districts. Business service yards will include a check-point, office, drying and storage facilities</p>
--	---

⁵⁰¹ In 2017 amendments related to timber sorting were elaborated within Resolution 242. Prior to the amendments there were only two sorting categories (fuelwood and construction timber). Since 2017 there are four categories of timber where 1 is the highest quality timber and 4 is fuelwood. Further discussions should focus on if fuelwood should include only category 4 or also category 3.

⁵⁰² Note: fuelwood harvesting volumes will need to take into account the regional demand

	(open air structure with a roof), and equipment for primary timber site manipulation. ⁵⁰³ Co-investments (GCF and government co-finance) ⁵⁰⁴ will be made to construct 14 new BSY facilities, and purchase equipment for 15 BSYs (including the 14 new facilities, plus a BSY that is undergoing construction in 2019 in Akhmeta district, supported by GIZ).
Implementation mechanisms	<ul style="list-style-type: none"> ▪ The implementation of this Activity will be led by NFA, particularly the Department of Forest Use and Regional Development. Within NFA the Financial Department will also have an important role in the implementation of this activity (financial planning, controlling and marketing), as well as Regional Services of NFA. GIZ will provide technical assistance for the implementation of this Activity, bringing important experience from developing a BSY in Akhmeta district. <p>Close coordination will be sought with the implementation of:</p> <ul style="list-style-type: none"> ▪ Activity 1.1 on financial and economic planning and monitoring, and on topics related to the timber value chain including the supply, harvesting and transport of timber to BSYs. ▪ Activities 1.2 (forest supervision) and 1.5 (MRV), especially on topics related to the electronic timber tracking system and forest incidence monitoring, as well as general coordination and information sharing through FIMS and other avenues. ▪ Coordination with Activity 1.4 will be further ensured, particularly in relation to the revision of key legal sub acts (esp. current 241 and 242).
Fund flow arrangement	GIZ AE will enter into a subsidiary agreement with NFA. The Subsidiary Agreement will be legally binding and outline the detailed financial, procurement and implementation plan of the relevant elements of the project, incl. reporting and liability requirements.
Budget/ Co-finance	<p>Total Activity Cost: EUR 16.90 million</p> <ul style="list-style-type: none"> ▪ Total GCF finance to NFA and GIZ: EUR 3.52 million <ul style="list-style-type: none"> ○ <i>Investments: BSY construction (co-investment); BSY equipment (co-investment),</i> ○ <i>Technical assistance: GIZ advisors, international and national experts for developing training modules on marketing, and training of trainers; Trainings for BSY staff on wood marketing, BSY SOPs</i> ▪ Co-finance Government: EUR 13.26 million ▪ Co-finance BMZ: 0.1 million

⁵⁰³ Appendix 5 provides more detailed construction specifics for the technical design of the yards.

⁵⁰⁴ Government funds will cover 50% of the investment costs, while GCF finance will cover the remaining 50%.

6.4.1.4 Activity 1.4 Enhancement of enabling environment for the nation-wide implementation of sustainable forest management

Activity 1.4 Enhancement of enabling environment for the nation-wide implementation of sustainable forest management (SFM)	
Contribution to GCF outcome(s)	M9.0 Improved management of land or forest areas contributing to emissions reductions
Contribution to project output	Sustainable forest management is implemented on 270,807 ha
Description of sub-activities	<p>At the national level, the project will support the implementation of key provisions of the new (draft) forest code that are essential for rolling out SFM. It includes the following sub-activities:</p> <p><u>Sub-activity 1.4.1 Strengthening of the legal framework for SFM</u></p> <p>With the approval of the new forest code anticipated in mid-to-late 2019, there are various secondary legal acts that will need to be revised and/or elaborated to enable SFM. As soon as the forest code is approved, revisions to secondary legal acts will begin to facilitate the adoption of SFM based on the forest code as well as national and management-level criteria and indicators. The revision and/or elaboration of these key legal acts will ensure that there are clear and consistent legal acts based on the new forest code to facilitate SFM that promotes multiple functions.</p> <p>With the anticipated approval of the forest code in mid-to-late 2019, such revisions will commence prior to project start. BMZ co-finance (GIZ) will support the revision of key regulations for SFM, in particular resolutions 179, 241 and 242 of Government of Georgia. While majority of revisions will be completed prior to project start, it is likely that some additional revisions may be required. BMZ co-finance will be dedicated to provide targeted support for regulatory revisions, building on GIZ and government efforts prior to project start.</p> <p>In addition to revising three of the main secondary legal acts for forest management and utilization, and elaborating secondary legal acts for the liability law, the project will also support the elaboration of a regulation on the commercial use of non-timber-forest products. The new forest code foresees the use of non-timber forest resources for commercial use, under the management of the NFA, however currently there is no specific regulation on this.⁵⁰⁵ The regulation will cover key topics including: types of non-timber forest resources that can be commercially harvested, amounts for each NTFP that can be commercially harvested to ensure sustainable management based on the principles of SFM, fees for commercial harvesting, processes for commercial harvesting (applications, forms, monitoring, timing / zones, among others).</p>

⁵⁰⁵ Note: currently, commercial use of NTFPs are not regulated (except for snowdrop (*galanthus*) and seeds of *abies nordmanniana*).

Sub-activity 1.4.2 Improvement of sector steering and coordination between involved sectors

The new forest code has major implications not only for the forestry sector, but also on topics related to energy efficiency, alternative fuels, rural development, and public health, among others. However, cross-sectoral coordination is limited, negatively affecting discussions and cooperation on key cross-cutting topics.

To support the operationalization of the new forest code, once approved, it is expected to continue to support the upgrading of the NFP process, which facilitates improved cross-sectoral cooperation and coordination, as well as information sharing.

The NFP process will build on the experiences and lessons learned from the NFP process,⁵⁰⁶ adapting the approach as necessary. The figure on the following page outlines the envisioned structure of the upgraded NFP process.

The Biodiversity and Forestry Department of MoEPA will coordinate the NFP process with technical assistance from GIZ (financed by BMZ) and organizes working group meetings, prepare meeting agendas, and support with moderation.

The upgraded NFP process is comprised of 7 working groups (Figure 80), including governmental and non-governmental organizations, the academic community, civil society, international donors, and private sector actors. The platform coordinator will support the development of annual work packages for each of the working groups, that will guide their work and clarify key topics, expected milestones and deliverables (if necessary). At the end of each year, a plenary meeting will be held to present the progress from the past year, including results from the working groups and progress with sector reform, and to inform stakeholder about plans for the upcoming year. Information from the working groups, plenary meeting and NFP coordinator will be presented to the forest sector reform steering committee. The committee will also provide feedback for the proposed work packages and annual planning for working groups.

Table 64: Working groups under the upgraded NFP process

Working Group	Mission
Reforestation and Forest Protection	Development of methods for reforestation, afforestation and forest maintenance, and forest protection from diseases and pests.
Alternative Energy Resources and Sustainable Use of Fuelwood	With sectoral cooperation, identification of alternative options for elimination of energy deficit.
Forest Education and Research	Promotion of education and research in higher education institutions, supporting formal and informal education.
Institutional Reform	Provision of support to the reform process of the state forest institutions, development of initiatives.
Forest Informational Systems	Preparation of recommendations to support the process of developing FIMS.

⁵⁰⁶ An Evaluation of the NFP Process since 2013 was conducted BFD in March 2019. It provides an overview of the process, as well as lessons learned and challenges. It further provides recommendations for adjustments of the process to improve the efficiency and effectiveness of the process. The proposed sub-activity builds off of the recommendations in the evaluation.

	Forests of Special Conservation Interests	Preparation of recommendations on the management of forests with special conservation value, offering solutions to key challenges.
	Forests and Climate Change	Develop measures to mitigate the impacts of climate change on the forests of Georgia, and suitable adaptation strategies and measures.

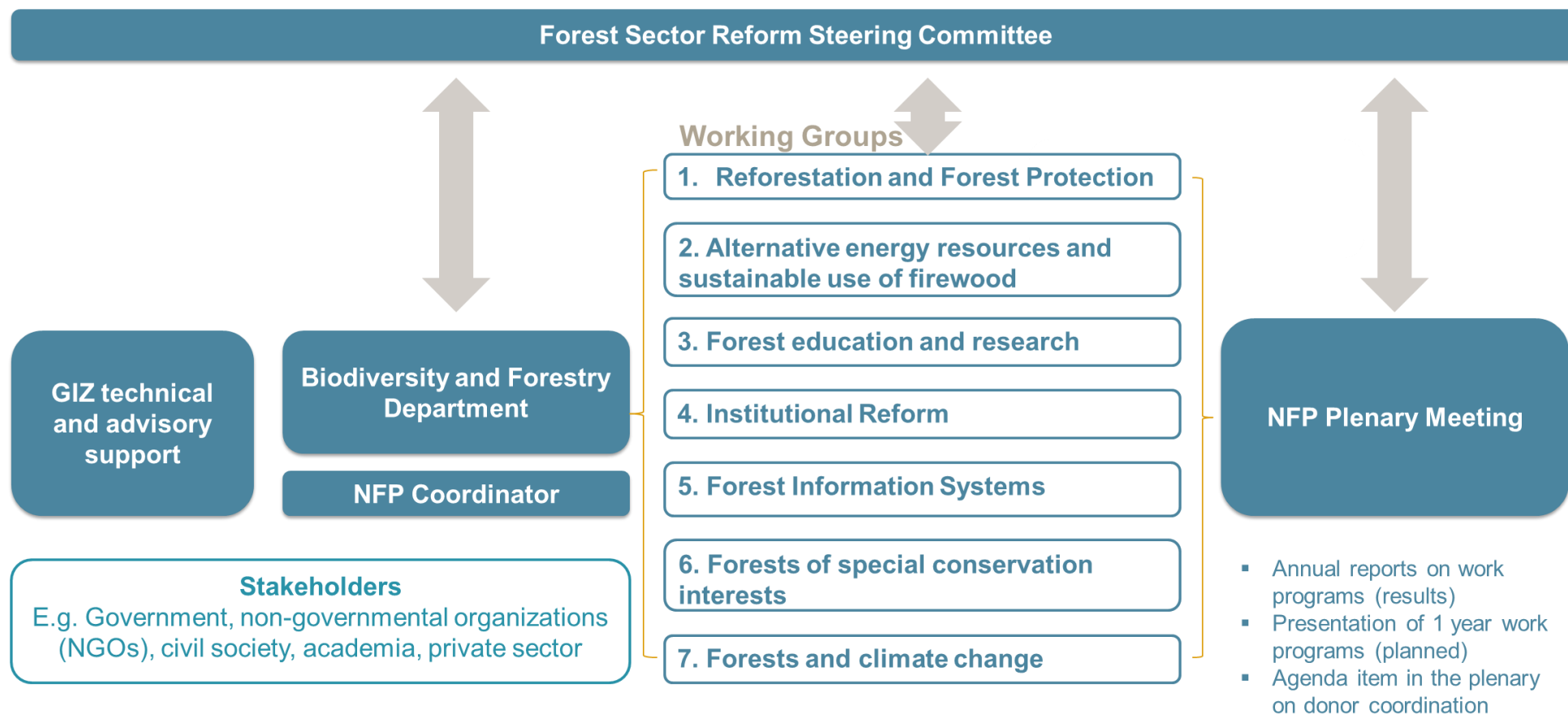


Figure 80: Overview of upgraded NFP process

The project will also support the establishment of a high-level cross-sectoral working group at the Vice-Minister level, with an aim to develop joint inter-ministerial initiatives and improve coordination across sectors. They will discuss key cross cutting topics related to the forest platform working groups, described above. More specifics on the working group are as follows:

- It will include representatives at the Vice-Minister level from the following institutions: MoEPA, Ministry of Economy and Sustainable Development, Ministry of Finance, Ministry of Regional Development and Infrastructure, Ministry of Infrastructure, Ministry of Energy as well as heads and/or deputy heads of important departments under these Ministries (e.g. BFD, DES) and LEPLs (e.g. NFA).
- Other stakeholders that will be invited to participate in targeted meetings include (among others): representatives from Ministry of Education, Science, Culture and Sport, State Procurement Agency, Georgian National Tourism Administration (e.g. on topics related to ecotourism), Environmental Information and Education Centre.

The high-level working group will meet twice a year.⁵⁰⁷ See Chapter 7.1 for information on the role of this working group in overseeing the Georgia Forest and Energy Investment Facility (GFREIF).

Sub-activity 1.4.3. Development of online knowledge management and training platform for the forest sector

Capacity building of MoEPA, NFA, DES and the private sector forest service contractors has been proposed as a tool to manage the project's impacts, and to address the main capacity gaps in the sector. Technical trainings are described within the other sub-activities, e.g. best practices for SFM cutting operations, best practices for forest patrolling and supervision, end-user trainings on FIMS modules, etc. Within all trainings gender, and occupational health and safety will be cross-cutting topics. Investments in strengthening knowledge on climate change adaptation and mitigation, and supporting the mainstreaming of this knowledge into training modules, protocols, manuals and guidelines will facilitate future adaptation and mitigation planning, ensuring that suitable adaptation strategies are adopted – with the potential to reduce future risks and damages due to climate change

More general trainings for the institutions include: conflict management, mediation and dispute resolution; communication and engagement with communities; occupational health and safety; and environmental communication. Management-focused trainings will build institutional competencies for dialogue and co-operation and increase environmental communication capacities within the three institutions to build inclusive sustainable development, whilst also safeguarding social and environmental impacts as well as gender aspects (see the Project's ESIA

⁵⁰⁷ Key topics that will be promoted include: Alternative fuels, energy efficiency; rural development based on sustainable SFM; phasing down fuelwood consumption, including the development of a social mitigation strategy that promotes alternative fuels, energy efficiency, rural development, subsidy policy for fuelwood for poor households, subsidies for public buildings; climate change adaptation, among others.

in Annex 6a to the Funding Proposal for more information). The development and implementation of these trainings will be supported by GIZ advisors and international and national experts. Training modules and informational materials will be integrated into a knowledge management and training platform (KMTP), which will include e-learning elements, videos, knowledge storage, and ultimately strengthen the management and dissemination of information (see Figure on next page). KMTP will support the institutionalization of trainings, and ultimately strengthen knowledge retention and institutional learning in MEPA, NFA and DES, as well as private sector actors. This will not only facilitate improved training of staff, but also improved information dissemination, awareness raising and capacity strengthening. The KMTP will ensure that people engaged in forestry sector have adequate knowledge and skills to effectively implement the actions considered under SFM under the new forest code through improved knowledge management and dissemination, and the institutionalization of key sector trainings. Improved individual and institutional capacity building, of implementation entities and other key stakeholders, will contribute to the long-term sustainability of project interventions through their improved skills, and awareness of the importance of ecosystem-based forest management and SFM. It will further promote investments in SFM, especially through the identification of opportunities for private sector actors (within trainings, and through information dissemination).

It will be designed with distinct access portals for DES, and NFA, and will allow for uploading protocols, handbooks, and other information for quality control, training portals (incl. areas for online courses, videos of trainings, etc.), among other features.

While each module will have a lead institution who provides insight on training content and oversees module development, EIEC⁵⁰⁸ is expected to oversee the broader functioning of the platform providing key coordination and logistical support (e.g. informing different stakeholders about training opportunities/ awareness raising, organizing venues, ensuring standard quality of trainings is maintained, conducting evaluation of trainings, among other tasks).⁵⁰⁹

Service providers will be contracted by EIEC to develop the platform, and can develop a new system or embed it in an existing platform. The service providers will also provide ongoing support to integrate training modules into the platform, incl. training EIEC technical staff to i) integrate training modules and other information into the platform, and ii) to operate and maintain the platform.

Sub-activity 1.4.4 Improvement of vocational education and training for the forest sector

To support country's forest reforms, it is expected the sector will generate substantial new opportunities for employment. In the explanatory note of the new

⁵⁰⁸ EIEC has an important role to support environmental education, outreach and capacity building throughout the country at the national, regional and local level.

⁵⁰⁹ EIEC is performing a similar role in the GCF project "Scaling-up Multi-Hazard Early Warning Systems and the Use of Climate Information in Georgia", where UNDP and GCF support EIEC to strengthen their institutional capacities and develop a training curriculum related to various climate-related topics (disaster risk reduction, early warning systems, etc.). Within the framework of UNDP's project EIEC has a core role in raising public awareness and supporting capacity building at all levels, including training government institutions at all levels as well as community-members. A core element of their work further focuses on training trainers, and strengthening knowledge retention within the institution. Thus, this project will build on the capacities developed and synergies with this project.

	<p>(draft) forest code it is stated that 348 jobs will be created in the first year alone for forest operation activities (logging, transportation, etc.). It further emphasizes the opportunities to offer formal employment to local people currently informally employed in fuelwood harvesting.</p> <p>The new (draft) forest code requires all foresters and forest workers, including existing NFA staff and future staff to obtain a formal qualification by 2025 (See Chapter 5.2). Thus, there is a strategic need to improve the forest education and vocational training situation in Georgia for both the medium- and long-term. GIZ, through its IBiS and ECOserve projects, already supports the Georgian Government to strengthen vocational education programs, including the development of accredited courses and trainings, training of trainers, and supporting two vocational education and training colleges to become accredited for the vocational education course “Forest Work Specialist” (in the regions of Kakheti, Samtskhe-Javakheti, Adjara, and Mtskheta-Mtianeti).</p>
--	--

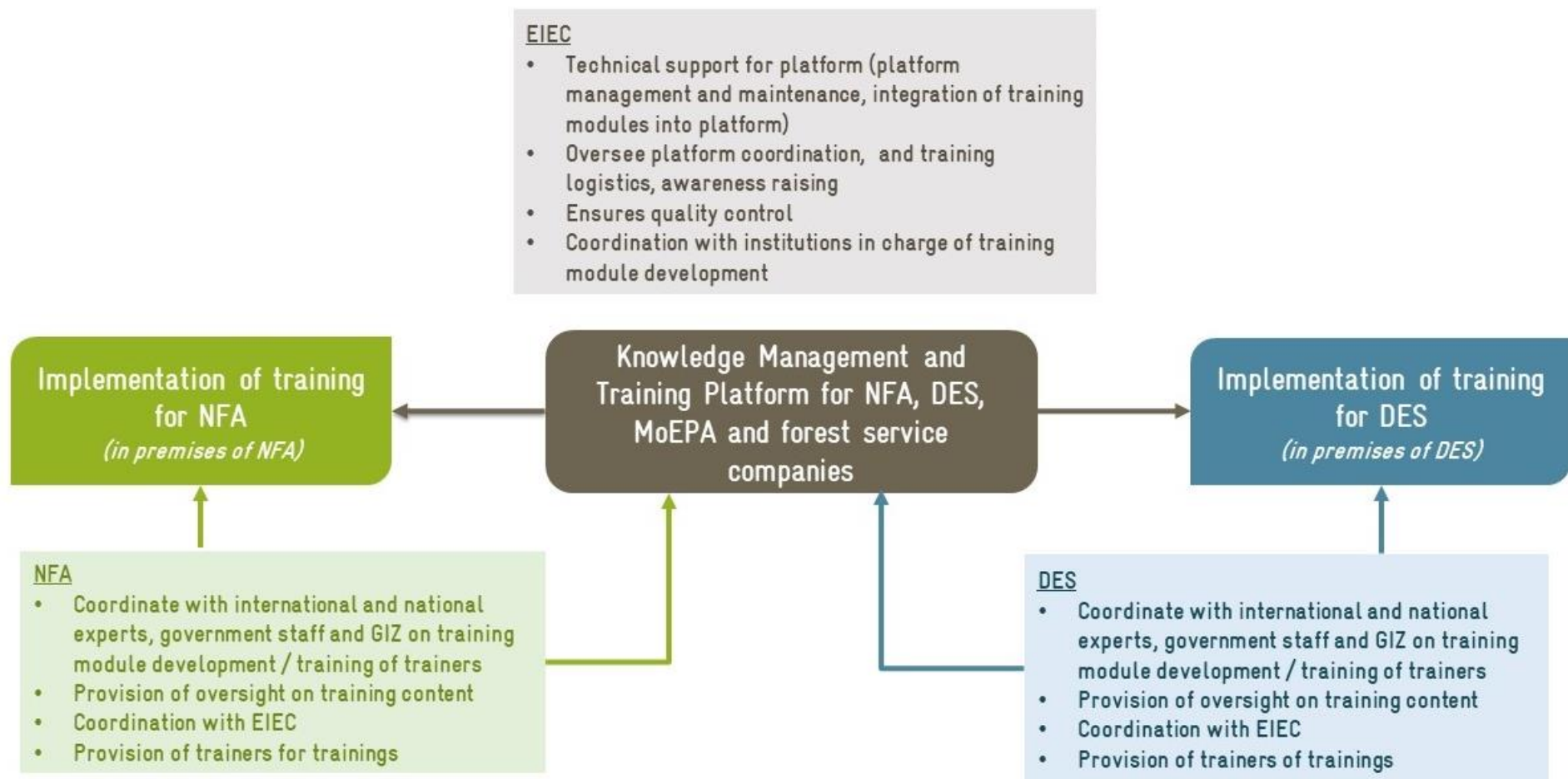


Figure 81: Overview of knowledge management and training platform: roles and responsibilities

	<p>BMZ co-finance will be dedicated to continue to support the Government of Georgia to strengthen vocational education and training for the forestry sector. It will support the integration of short-term trainings into accredited modules and trainings, and will support NFA to design educational and training programs to support existing and new staff with different options to obtain official qualifications (complying with the new forest code). Currently VET programs can be completed in 9 months, however NFA will need to develop a simplified approach for existing staff, as well as an approach to support the integration of local people who were formerly involved in the informal harvesting of fuelwood and timber.</p> <p><u>Sub-activity 1.4.5 Enabling improved integration of climate change adaptation in forest sector planning, management and monitoring</u></p> <p>As presented in the previous Chapter, while climate change poses a unique challenge for forest ecosystems in Georgia, a major challenge is the lack of detailed studies and information on the specific regional conditions, contexts, vulnerabilities and suitable adaptation strategies. Innovative methodologies for conducting vulnerability studies in forest ecosystems have been piloted in Georgia in recent years, however these studies only focus on a few select regions (i.e. Adjara). Some impacts of climate change on forests (mostly in West Georgia) are already being observed such as increased occurrence of pests and diseases, shift in forest line, and increased fire hazard.</p> <p>This sub-activity aims to improve knowledge on climate risk and adaptation strategies in forest ecosystems, and enable improved integration of climate change adaptation in forest sector planning, management, and monitoring. Specifically, it supports via GCF funding:</p> <ul style="list-style-type: none"> ▪ Assessment of climate risk and vulnerability for each of the three target regions (Guria, Kakheti and Mtskheta-Mtianeti): These assessments will build on the FMI and FMP data collected during the first years of the project, as well as NFI data, and satellite land cover data for areas not covered in FMPs (e.g. protected areas). It will further utilize climate model outputs from the Hydro-meteorological Institute from the Georgian National Environmental Agency.⁵¹⁰ The assessments will make use of the weather and climate information and meteorological information services provided by the ongoing GCF project in Georgia on Scaling-Up Multi-Hazard Early Warning System and the Use of Climate Information implemented by UNDP. International and national experts will be contracted to lead the assessments, however government staff from MoEPA will be continuously engaged and trained on how to conduct such assess-
--	--

⁵¹⁰ Including raster data of average summer temperatures, average summer precipitation and summer aridity index for 2021-2050 and 2071-2100.

	<p>ments. Stakeholder consultations will also be conducted in the region (including field consultations and regional workshops), and in a national workshop to triangulate data, provide key feedback and validate the results of the studies. The results will be presented in 3 reports (1 report per region). Assessments of climate risks and vulnerability in Georgian forests would also make use of the standardized risk assessment and modelling methods and technologies that are being introduced by the ongoing GCF project on Scaling-Up Multi-Hazard Early Warning System and the Use of Climate Information in Georgia. The findings and recommendations from these reports will be mainstreamed in FMPs, annual plans, and other government strategies and commitments (e.g. NDC, National Adaptation Plans, 4th National Communications, etc.).</p> <ul style="list-style-type: none"> ▪ Establishment of a national dialogue on adaptation strategies for forest ecosystems: Within the NFP process (Sub-activity 1.4.2), in particular in the climate change working group a national dialogue on adaptation strategies for forest ecosystems will be established. Results from the studies will be presented to the working group, and the group will continue to work on scaling up the adoption of suitable adaptation strategies in the sector, and ultimately improve awareness on climate change. They will further look at strengthening adaptation monitoring in the sector (e.g. within FIMS). ▪ Training on climate risks for forest ecosystems for NFA and MoEPA: The findings of the regional assessments will be integrated into targeted trainings to raise awareness of climate risks for forest ecosystems in Georgia, and key considerations for climate-resilient planning, management and monitoring in forest ecosystems, based on suitable adaptation strategies identified in the assessment. Trainings will involve a mixture of e-courses and classroom trainings. In addition, climate change adaptation strategies identified will be mainstreamed into training modules related to SFM (e.g. within Activity 1.1). <p>To the greatest extent possible, climate change adaptation and best practices for climate-resilient forest planning and management will be mainstreamed into existing protocols, guidelines and manuals.⁵¹¹</p>
Implementation mechanisms	<ul style="list-style-type: none"> ▪ Sub-activity 1.4.1: The implementation of this Activity and its Actions will be led by MoEPA, particularly the Department of Biodiversity and Forestry. MoEPA will ensure close coordination with relevant institutions related to the secondary legal acts (NFA, DES, Akhmeta Municipality, etc.). They will further oversee stakeholder consultations on related regulatory changes.

⁵¹¹ Currently vocational education and training programs are 9 months for 'Forest Worker' programs, however in the future they may be extended to 11-15 months programs.

	<ul style="list-style-type: none"> ▪ Sub-activity 1.4.2: The implementation of this Activity and its Actions will be led by MoEPA, particularly the Department of Biodiversity and Forestry for all. MoEPA will be responsible for mobilizing diverse stakeholders (NGOs, academia, civil society, private sector etc.) to participate in the working groups. ▪ Sub-activity 1.4.3: The implementation of this Activity and its Actions will be led by EIEC, in close coordination with DES, NFA and MoEPA. ▪ Sub-activity 1.4.4: The implementation of this Activity and its Actions will be led by MoEPA, in close cooperation with EIEC, NFA, DES, the Vocational Education Development Department, the National Center for the Educational Quality Enhancement of the Ministry of Education, Science, Culture and Sport of Georgia, and other key forest sector actors (AFA, APA, Tbilisi City Hall, Akhmeta Municipality). ▪ Sub-activity 1.4.5: The implementation of this Activity and its Actions will be led by MoEPA, particularly the Department of Biodiversity and Forestry and Climate Change Division, in close cooperation with NFA, and other relevant forest sector agencies in the region (APA), among others. They will further oversee stakeholder consultations in the target region and at the national level.
Co-finance / leverage	<p>Total Activity Cost: EUR 4.30 million</p> <ul style="list-style-type: none"> ▪ Total GCF finance: EUR 1.34 million <ul style="list-style-type: none"> ○ <i>Technical Assistance: GIZ advisors, international and national expert to support the revision and elaboration of regulations; support to working groups; development of software/knowledge development platform; GIZ advisors, international and national experts for forest climate risk assessments in target regions.</i> ▪ Co-finance Government: EUR 0.61 million ▪ Co-finance BMZ: EUR 2.35 million
Fund flow arrangements	<p>GIZ AE will enter into a subsidiary agreement with EIEC for sub-activity 1.4.3 and a subsidiary agreement with NFA for sub-activity 1.4.5. The contract will be legally binding and outline the detailed financial, procurement and implementation plan of the relevant elements of the project, incl. reporting and liability requirements. The GCF funding for the other sub-activities will be implemented by GIZ in its function as Executing Entity.</p>

6.4.1.5 Activity 1.5 Improvement of monitoring, and measurement, reporting and verification systems for the forest sector

Activity 1.5 Improvement of monitoring and measurement, reporting and verification (MRV) systems for the forest sector	
Contribution to GCF outcome(s)	M9.0 Improved management of land or forest areas contributing to emissions reductions
Contribution to project output	Sustainable forest management is implemented on 270,807 ha
Description of sub-activities	<p>Activity 1.5 supports the strengthening of the Georgian Forest Information and Monitoring System (FIMS), aligned with national MRV requirements, to improve sector planning and implementation.</p> <p>The [forestry component] MRV system aims to:</p> <ol style="list-style-type: none"> 1. Track changes in forest carbon sequestration embedded in the national forest information and monitoring system (FIMS) 2. Monitor co-benefits (e.g. adaptation, environmental conditions, socio-economic benefits, etc.) <p>It builds on the ongoing development of FIMS, and will be designed in a way that can contribute to NDC tracking and the Transparency Framework for Action and Support (under the Paris Agreement). The activity is comprised of the following sub-activities:</p> <p><u>Sub-activity 1.5.1 Strengthening of the national forest monitoring and MRV architecture</u></p> <ul style="list-style-type: none"> ▪ Regulatory Framework and Institutional set-up: Clarification of roles and responsibilities, establishment of standard operating procedures & methodologies for data collection/ analysis. In addition, international and national expert support will be provided for the integration of FIMS into secondary legal acts, which will be revised after the adoption of the forest code. ▪ The development of Georgia-specific accounting systems (default values, forest emission factors, equations) will be supported by the project. This includes providing international and national experts to develop allometric equations, which will involve a combination of field work, laboratory work and in-office analytical work. Two technical workshops will be held to discuss i) the methodology and ii) to validate the findings. ▪ Supporting the development of a carbon processing module as base for reporting on carbon (concept development). ▪ Support the concept development of a data warehouse module in FIMS allowing to report on NDC tracking and the Transparency Framework for Action and Support under the Paris Agreement, among other topics. <p><u>Sub-activity 1.5.2 Development of FIMS modules</u></p> <ul style="list-style-type: none"> ▪ Procurement of equipment (database, server)

- Improvement of FIMS modules under development (procurement or development of software modules), including those described in greater detail in the Table below (see Chapter 5.2.3.4.2 for a more detailed description of FIMS):⁵¹²

Table 65: Overview of FIMS modules and improvements to be made within the context of sub-activity 1.5.2

FIMS Module	Measures to be implemented
Forest Operations software (i.e. forest operation software modules including the “Electronic System of Timber Resources Management”)	<ul style="list-style-type: none"> ▪ Register measures of forest use, wood transportation and primary processing activities. ▪ Addressing gaps in current software systems of DES and revenue services (lack of linkages between pre-processing and post-processing results in limited ability of DES to track timber after processing in sawmills) ▪ Add an <i>Annual Operational and Budget Planning</i> module ▪ Add an <i>Activity Recording</i> module
Forest Management Planning & Forest Management Inventory software	<ul style="list-style-type: none"> ▪ Support the development of a FMP module integrating a sample based forest management inventory (FMI).
National Forest Inventory software	<ul style="list-style-type: none"> ▪ Support the development of the NFI software for data analysis and reporting
Cadaster and land registration	<ul style="list-style-type: none"> ▪ Support the development/purchasing of a software module to manage the digital cadastral parcels covering forest (Ministry) or parcels that are managed by the NFA. Eventually, this model could be integrated into the SITI_Agri module purchased by the Ministry of Agriculture’s Wine Agency, however software development is still required.
Forest Site Mapping	<ul style="list-style-type: none"> ▪ Support the development/purchasing of a software module being able to analyze and manage the results of the recently developed forest site mapping inventory, which is planned to be started in 2019 in parallel with the NFI.
Forest Function Mapping	<ul style="list-style-type: none"> ▪ Support the development/purchasing of a software module for Forest Function Mapping /Zoning.
Central Forest Database	<ul style="list-style-type: none"> ▪ Support the development of a central dynamic Forest Database at the Ministry and with installations at other forest management bodies (at NFA for the forests under NFA management). As the central database is dynamically updated over time, analytical reports to monitor carbon, biodiversity indicators and forest adaptation to climate change can be developed and implemented here.

⁵¹² Many of these activities are being currently supported under the GIZ IBiS program, however continued support from 2020 onwards is necessary. A combination of GCF, as well as BMZ and government co-finance has been targeted to support these activities.

	Incidence Monitoring	<ul style="list-style-type: none"> Support the development/purchasing of a Forest Incidence Monitoring software able to detect any unplanned changes in the forest area or structure (fire, pests, storms, illegal harvest) using advanced remote sensing techniques and linked to an alert system to inform and mobilize NFA but also DES.
	Utilization rights	<ul style="list-style-type: none"> Support the development/purchasing of a software able to register utilization rights and its management referring to certain forest areas or parcels.
	Data warehouse and reporting, carbon calculation module	<ul style="list-style-type: none"> Implement the data warehouse module as retrieval and reporting module of FIMS. Special reports for international and national reporting (FRA, Forest Europe, monitoring report for C&I) are configured and allow a fast and precise reporting. Moreover special reports for the forest contribution to the national MRV system will be configured based on the calculations in the carbon calculation module and allow a fast transfer of data to the national MRV system.
	Development and implementation of an interface with the Transparency Framework for Action and Support for reporting to the UNFCCC	<ul style="list-style-type: none"> Once the concept of a national MRV /ETF system is developed, aligned with rules for the UNFCCC's Transparency Framework for Action and Support,⁵¹³ the interface with the FIMS data warehouse system will be designed and developed.
		<ul style="list-style-type: none"> Development of training modules for FIMS and MRV modules (e.g. FIMS modules, control mechanism, QA/ QC) Implementation of training courses Development of help desk and software support
Implementation mechanisms	<p>Since the initiation of FIMS, GIZ has been a main actor supporting the Government of Georgia to developing the FIMS and supporting related ongoing processes (NFI, FMI, among others). In order to ensure consistency in the applied approach, BMZ has committed additional co-financing to support the Government of Georgia to implement Activity 1.5.</p> <p>Sub-activities 1.5.1 and 1.5.2:</p> <ul style="list-style-type: none"> The entire Activity will be implemented under the responsibility of EIEC, in close cooperation with the FIMS technical working group, and other key stakeholders (DES, APA, NFA).⁵¹⁴ It will be implemented in close coordination with technical and financial support from an expert team from GIZ. The GIZ expert team will provide the technical guidance and capacity development support to all stakeholders. 	

⁵¹³ The modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement are described in Decision -/CMA.1 from the UNFCCC Conference of the Parties (COP) 24 in Katowice in December 2018.

⁵¹⁴ A central FIMS technical working group was established in 2018 and is supporting the development of FIMS.

	<ul style="list-style-type: none"> For each new developed FIMS module an expert team from the developing company / institution (i.e. Ministry of Finance IT team) and the main user (NFA, DES) shall be formed. Close coordination will be ensured with other agencies responsible for modules under FIMS (institutional set-up to be clarified in Sub-activity 1.5.1). The EIEC IT team is involved as EIEC will provide the necessary IT infrastructure and is responsible to set standards for DBMS, server and server, web-server software, hosting, IT security and is responsible for other software products like office software.
Fund flow arrangement	<ul style="list-style-type: none"> GIZ will be the executing entity. MoEPA, its relevant departments and other institutions responsible for FIMS modules (e.g. EIEC, NFA, etc.), as the implementing entities, will provide expert staff for the implementation of the entire Activity. It will also provide co-investments in hardware for FIMS, and will cover operation and maintenance costs. GIZ will provide permanent technical expert staff. The cost for the expert staff and associated logistics as well as national and international experts, software development, etc. will be provided by BMZ and GCF.
Budget/ Co-finance	<p>Total Activity Cost: EUR 5.42 million</p> <ul style="list-style-type: none"> Total GCF finance: EUR 1.53 million <ul style="list-style-type: none"> <i>Technical assistance: GIZ advisors, international and national experts to support preparation of MRV/climate related modules, research and workshops on allometric equations and national forest emission factors; field work and equipment for soil and carbon analysis</i> Co-finance Government: EUR 2.20 million Co-finance BMZ: EUR 1.69 million

6.4.2 Component 2 Market Development for Energy Efficiency (EE) and Alternative Fuels (AF)

Deployment of energy efficient (EE) technologies and alternative fuel (AF) solutions can substantially reduce demand for fuelwood in the household sector. However, the market for EE and AF products is at a very nascent stage. There is only a limited number of local manufacturers or technology suppliers (e.g. 15 producers of EE stoves and 3 briquette manufacturers), the quality of their products and services vary significantly and so does the capacity to improve and expand their offer to the market. The project will adopt a “push and pull” approach to stimulate development of EE-AF market: Activity 2.1 will push the supply chain to prepare the sector for expedited growth, while Activities 2.2 – 2.4 will pull the demand to jump-start the market via consumer awareness raising, financial incentive and consumer financing products in partnership with financial institutions, as well as by creating conducive policy and regulatory framework (See Figure below).

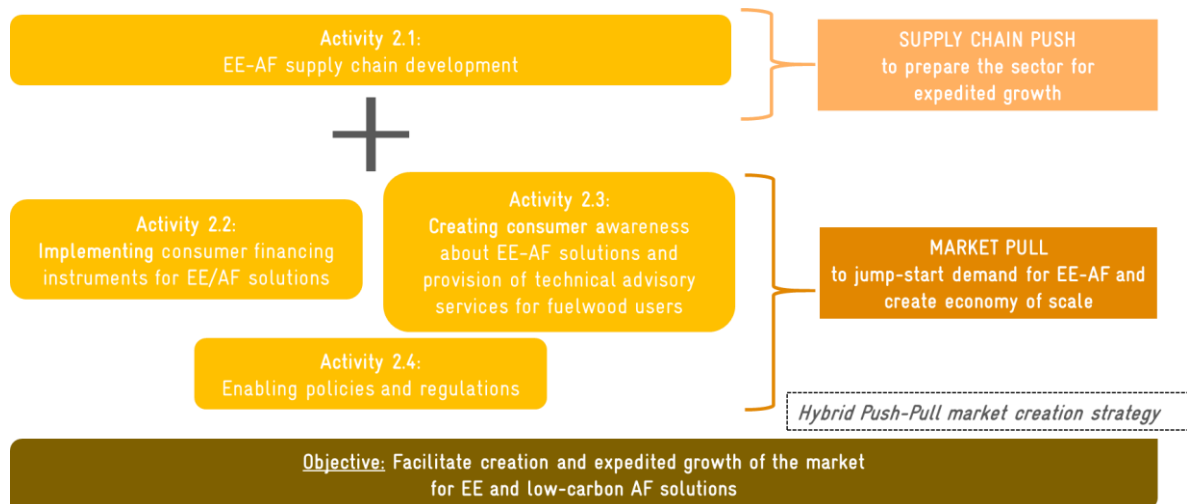


Figure 82: Push & Pull Approach for Component 2

6.4.2.1 Activity 2.1 EE-AF supply chain development

Activity 2.1 EE-AF supply chain development	
Contribution to GCF outcome(s)	M7.0 Lower energy intensity of buildings, cities, industries and appliances
Contribution to project output	Market Development for Energy Efficiency (EE) and Alternative Fuels (AF)
Activity description	<p>Objective of this activity is to facilitate creation and expedited growth of the supply chain for EE and low-carbon AF solutions. It consists of two complementary sub-activities:</p> <ul style="list-style-type: none"> ▪ Sub-activity 2.1.1 Establishing Technical Assistance and Investment Support Facility, TAISF (ARDA) ▪ Sub-activity 2.1.2: Feasibility assessment and pipeline development for new EE-AF solutions (GIZ) <p>Sub-activity 2.1.1 will focus on the two existing EE-AF supply chains: energy efficient stoves (solid fuel-based space heaters) and USB products from forest and agricultural residues (Figure 83). In parallel, Sub-activity 2.1.2 will support identification and feasibility assessment for other EE-AF alternatives for which the supply chain does not exist yet in Georgia.</p>

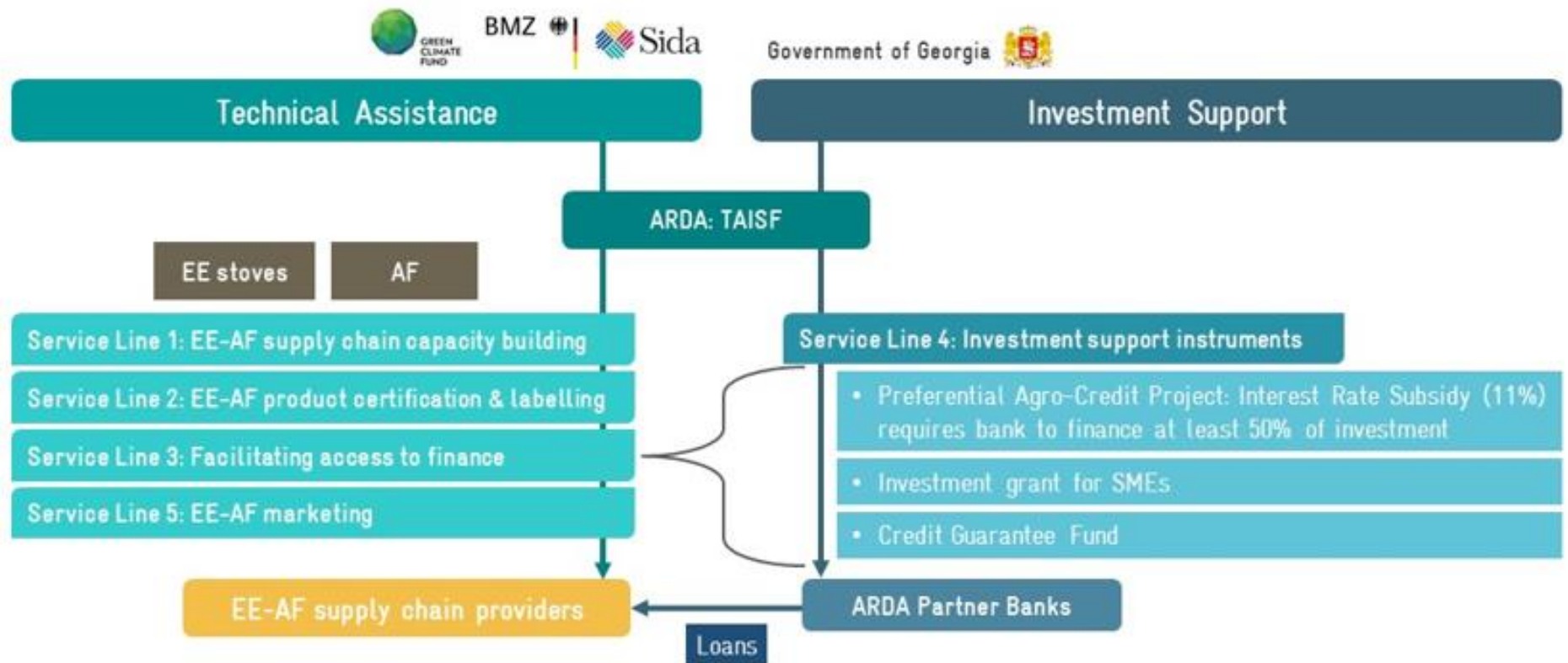


Figure 83: Technical Assistance and Investment Support Facility (TAISF)

Description of sub-activities	<p><u>Sub-activity 2.1.1: Establishing Technical Assistance and Investment Support Facility (ARDA)</u></p> <p>A Technical Assistance and Investment Support Facility (TAISF) will be established to facilitate the development of supply chain for efficient space heaters (EE stoves) and USB manufacturers. TAISF will operate nation-wide, however through complementary Activity 2.3 a particular focus will be made on the three target regions, Kakheti, Guria and Mtsheta-Mtianeti.</p> <p>The key objectives of the TAISF are to:</p> <ul style="list-style-type: none"> ▪ Improve technical, managerial and financial capacities of SMEs, cooperatives and individuals involved in EE-AF supply chain ▪ Ensure availability of certified EE-AF products on the market in line with applicable international EE and environmental standards ▪ Facilitate access to financing for supply chain businesses to invest in new and/or expansion and improvement of existing EE-AF production and delivery capacities ▪ Facilitate EE-AF products marketing ▪ Support investment in EE-AF value chain <p>TAISF will build on existing TA and Investment Support Facilities established at ARDA in line with its mandate to promote and stimulate development of agricultural production-oriented industries in the regions of Georgia. TAISF will operate as a one-stop-shop for Georgian enterprises involved in EE-AF supply chain and provide a range of services to existing and new EE-AF suppliers through the five dedicated service lines aligned with the Facility's key objectives. ARDA will host the Facility and ensure close coordination between its Technical Assistance (TA) and Investment Support components, as illustrated in the Figure 2 below.</p> <p>Technical assistance (consultants to run advisory services in service lines, portfolio development, GIZ advisors, capacity building) will be financed by GCF and BMZ. In addition, TA will be provided by Swedish International Development Agency (SIDA) to facilitate mainstreaming of environmental considerations in the scope of ARDA's investment support, as well as the design of new investment support instruments aimed specifically at green rural development and green energy solutions in rural areas.</p> <p>Investment support (Service line 4) in the form of investment grants, interest rate subsidies and guarantees on commercial loans is going to be financed by the government of Georgia</p> <p>Service line 1:</p> <p>TAISF will offer a package of training and capacity development activities to manufacturers of EE stoves and USB, including training on skills development, advisory services on technology application/improvement of production and delivery systems, provision of information on applicable standards and requirements (in coordination with Activity 2.4 which will support development and adoption of such standards nation-wide).</p> <p>Capacity building will be provided through the direct advisory services to enterprises, regular training events and workshops (content and schedule of the educational events will be developed annually and tailored to the identified</p>
--------------------------------------	---

	<p>sector needs), as well as via production and dissemination of educational and learning materials.</p> <p>TAISF will establish a data-base of EE stoves/USB manufacturers in Georgia based on the inventory of suppliers compiled at Funding Proposal development stage with opportunities for larger businesses based in Georgia which may also become a part of the EE – AF supply chain. The data-base will be used to engage pro-actively with suppliers, promote and tailor TAISF services and training program to the specific industry needs. It will also aid in monitoring progress in supply chain development and reporting to GCF.</p> <p>Service line 2:</p> <p>Stoves and USB currently available on the Georgian market are not subject to any mandatory standards, are often of low/inferior quality, and their energy/environmental/health performance characteristics cannot be verified by consumers (in particular for domestically produced heat stoves). Lack of quality standards leads to sub-standard, inefficient products being over-represented in the market. There are also quality control issues, which include the high cost and logistical challenges of accessing product certification services, which are not available in Georgia. To address this barrier TAISF will support certification of locally produced solid fuel-based space heaters and USB for compliance with EE and environmental standards set-forth by the EU Ecodesign Directive (See description of Activity 2.4 for further details about EU Eco-design Directive and the process of its transposition in Georgia). The following type of assistance is envisaged:</p> <ul style="list-style-type: none"> ▪ Raising suppliers’ awareness about applicable standards and requirements ▪ On-site inspection of the manufacturing sites and of products and advising on how compliance with applicable standards can be improved ▪ Preparing application for product certification by accredited certifiers/verifiers⁵¹⁵, including confirmation of the conformity of products and/or production processes with the requirements of the applicable standard. <p>Only certified products will be eligible for participation in the GCF-supported financial incentive scheme to be implemented under Activity 2.2.</p> <p>Service line 3:</p> <p>Most of companies currently present on the EE-AF market are self-financing their business operations. In terms of access to finance, most producers cannot access finance through the commercial banking sector or micro-finance institutions (MFIs). For example, from the 14 existing EE stove producers surveyed by the project development team, none has experience with loan financing: stove producers are either self-financing their investment or rely on clients’ prepayment. This is not due to a lack of potential financing options, but rather due to the low level of financial literacy of the local SMEs and lack of experience and skills with development of bankable projects. TAISF will support development of business plans for EE-AF suppliers to support their</p>
--	--

loan applications via ARDA partner banks, as well as to access investment support instruments offered by ARDA.

Service line 4: Implementation of investment support instruments

Under Service Line 4, TAISF will implement publicly-funded financial instruments to enable EE-AF suppliers' access to commercial loans via ARDA partner banks (Text Box 2: ARDA Partner Banks). Investment support instruments will be modelled based on ARDA's current investment support portfolio, which includes the following products:

ARDA Partner Banks

- Bank of Georgia
- TBC Bank
- Basis Bank
- VTB Bank of Georgia
- Procredit Bank
- Tera Bank
- Cartu Bank
- Halyk Bank
- Pasha Bank
- Georgian Leasing company
- TBC leasing

- *ARDA Preferential Agricultural Agro Credit Project* co-finance interest rate on commercial loans from ARDA Partner Banks for the investment in rural SMEs' production assets (up to 11% and 66 months) and working capital (up to 8% and 15-36 months). The former is mainly applicable to new manufacturers to finance their start-up investment needs, while the latter is an important instrument for existing producers, e.g. to ensure availability of the working capital to fi-

nance supply of raw materials. Up to now, the Agricultural Agro Credit Project has supported establishment of 145 new SMEs and re-equipped over 900 SMEs and facilitated loan financing in the amount of over 250 million USD in the agricultural sector.

- *ARDA "Processing Enterprises and Storage Facilities Project"* co-finance up to 40% of the production costs (600,000 GEL max). A minimum of 10% beneficiary's contribution is required and in addition at least 50% of the costs should be financed through a commercial loan with ARDA co-financing via an interest rate subsidy under the Preferential AgroCredit Project.
- *ARDA Credit Guarantee Fund* to safeguard the loans under the interest rate subsidy scheme.

Technical assistance will be provided to ARDA (co-financed by SIDA) to support the development of new investment support scheme for green energy producers/equipment suppliers, as well as to facilitate mainstreaming of environmental considerations in the scope of ARDA's investment support.

Service line 5: EE-AF products marketing.

Under this service line, TAISF will provide marketing support for EE-AF suppliers to help promote their products to potential customers. Specific support activities will include:

- Training and individual advice on marketing strategy and product branding

	<ul style="list-style-type: none"> ▪ Support with identification of potential corporate and public sector customers through market research and in conjunction with Activity 2.5 (Implementing energy efficient public procurement program) ▪ Publication of catalogue of Georgian EE-AF products and its dissemination to potential clients at the national and local level (in conjunction with the Activity 2.3) <p><u>Sub-activity 2.1.2 Feasibility assessment and pipeline development for new EE-AF solutions</u></p> <p>Under Sub-activity 2.1.1 the project will focus and support those EE-AF products which are both already available on the local market. However, the range of potential solutions to reduce fuelwood consumption in rural Georgia is much broader and includes such technologies as the installation of energy efficient central heating systems in houses, implementation of comprehensive energy efficient retrofit measures (insulation), solar water heating (SWH) systems, biogas, production of pellets and utilization of wider range of agricultural residues (e.g. straw) for rural heat supply. None of these solutions is yet sufficiently localized and commercialized in Georgia. So far, their application has only been tested through a few donor-funded demonstration projects. Therefore, under Sub-activity 2.1.2 the project will support identification and promotion of other EE-AF alternatives for rural energy supply by conducting feasibility studies, market assessment and business plan development for new EE-AF solutions.</p> <p>The project will also collaborate closely with the Georgian Partnership Fund (GPF) to identify and prepare investment project which GPF could support with its equity. At the moment the market for EE-AF products is very nascent on supply and demand side and does not represent a viable investment case for GPF. As the market for EE-AF will grow and new opportunities for revenue generation in EE-AF sector will be identified, the scope and modality of GPF's investment in the sector will be more precisely defined.</p>
Implementation mechanisms	<p>ARDA has been identified as the Executing Entity for this Activity.</p> <p>Provision of TA services will be sub-contracted by ARDA to a qualified service provider to deliver the following services (either via one or separate sub-contracts):</p> <ul style="list-style-type: none"> ▪ Service-line 1: Building capacity of EE-AF suppliers ▪ Service line 2: Supporting EE-AF product certification ▪ Service-line 3: Pipeline development and project preparation for investment support ▪ Service line 5: Marketing of EE-AF products <p>ARDA will nominate a Project Coordinator (from among its staff) to oversee TAISF. S/he will be supported by GIZ-hired technical expert and financial advisor.</p>

Fund flow arrangement	<ul style="list-style-type: none"> ▪ GIZ will enter into a Subsidiary Agreement with ARDA. The Subsidiary Agreement will be legally binding and outline the detailed financial, procurement and implementation plan of the relevant elements of the project, including reporting and liability requirements. ▪ SIDA will directly enter into a Subsidiary Agreement with ARDA for its technical assistance contributions.
Budget/Co-finance	<p>Total Activity Cost: EUR 7.45 million</p> <ul style="list-style-type: none"> ▪ Total GCF finance: EUR 1.70 million <ul style="list-style-type: none"> ○ <i>Technical assistance: Service provider, GIZ advisors, international and national experts to provide advisory services to EE-AF producers under Service lines 1, 2, 3 and 5</i> ▪ Co-finance Government: EUR 4.31 million ▪ Co-finance BMZ: EUR 0.78 million ▪ Co-finance SIDA: EUR 0.66 million

6.4.2.2 Activity 2.2 Implementing consumer financing instruments for EE-AF solutions

Activity 2.2 Implementing consumer financing instruments for EE-AF solutions	
Contribution to GCF outcome(s)	M7.0 Lower energy intensity of buildings, cities, industries and appliances
Contribution to project output	Market Development for Energy Efficiency (EE) and Alternative Fuels (AF)
Activity description	<p>This Activity will, in partnership with national financial organizations, local banks and MFIs, provide a package of consumer financing options focusing initially on EE stoves and USB (Sub-activity 2.2.1 and 2.2.2), but gradually expanding to other more sophisticated EE-AF technologies (Sub-activity 2.2.3). The objective of this Activity is to jump-start the market and to significantly scale-up demand for EE-AF products (EE stoves and USB) in target regions. It is also meant to provide meaningful and practical alternative to the population of the regions, which will be the first to be affected by the forestry sector reform, reduced availability /high price of the fuelwood (Component 1).</p> <p>Consumer financing for EE stoves and USB to be structured via GCF project will feature:</p> <ul style="list-style-type: none"> ▪ Results-based financial incentive in the form of price discount (via a voucher scheme) on the purchase of EE stove from certified suppliers. Initially, the size of the incentive will be set-up at 30% of the market price and the target is to stimulate demand for up to 30,000 EE stoves by the project end cumulatively. However, the design of the scheme and the amount of incentive shall be progressively revised and adjusted over the project implementation in response

	<p>to the overall market development, availability and price of certified products and consumers' demand. Initially, the scheme will target (via marketing and consumer awareness) the population of three target regions. As the SFM will scale-up and EE market grow, along with scale of EE stoves production, it is anticipated that the economy of scale will drive the cost of production and retail price down leading to reduced retail price of EE stove and progressively diminishing the need for financial incentive.</p> <ul style="list-style-type: none"> ▪ Consumer loans to households from local financial organizations will cover up to 70% of the costs of EE stove only or EE stove + annual USB supply package depending on the consumer choices. Technical assistance will be provided to MFIs and commercial banks to structure and promote such loan products in partnership with certified EE-AF suppliers. In parallel the project will also work with other financial institutions to structure financing for investment in EE-AF by local businesses, such as hotels and restaurants. <p>Georgian financial sector has positive experience with similar consumer financing schemes, such as, for example EBRD Sustainable Energy Financing Facility (SEFF), which proved instrumental in stimulating demand among households for certain category of consumer goods, e.g. domestic EE appliances. Number of Georgia's financial institutions which have been consulted (TBC Bank and ProCredit Bank) have expressed preliminary interest to partner with GCF project on developing a consumer financing loan to complement GCF-supported financial incentive. Among potential financial partners consulted through the Funding Proposal development stage, Crystal Bank, Georgia's largest MFI, is the most advanced in developing new loan product specifically for EE-AF; the bank has conducted in-depth market study for this product and is currently piloting a prototype scheme to collect additional data and information on consumers' readiness and willingness to finance and the impacts of EE stove adoption and switch to AF on households. Crystal has also entered into a partnership agreement with existing EE stove supplier and due to negotiated discount on the selling price will be able to offer an interest free loan to households.</p>
Description of sub-activities	<p><u>Sub-activity 2.2.1: Design, implementation and marketing of the voucher program for EE stoves for households (ARDA)</u></p> <p>Implementation of the financial incentive will be administered by ARDA. A service provider will be sub-contracted by ARDA to design and run a voucher program for EE stoves in line with key parameters of the program, such as:</p> <ul style="list-style-type: none"> ▪ Maximum amount of grant per stove: 30% in the initial phase ▪ Confirmation of available financing ▪ Annual voucher distribution plan ▪ Measures to ensure avoidance of fraudulent practices ▪ Monitoring and reporting arrangements on the distribution and utilization of vouchers <p>The following specific tasks will be undertaken by sub-contracted service providers:</p> <ul style="list-style-type: none"> ▪ Design voucher form (print, on-line) and prepare production specification ▪ Run voucher distribution ▪ Promotion and marketing of the voucher program among targeted audience ▪ Program monitoring to track data and continuously update market information

	<ul style="list-style-type: none"> ▪ Regular liaison with EE-AF producers and MFIs ▪ Regular reporting on the status and results of the voucher program <p>ARDA will be directly responsible for administration of the voucher program, including:</p> <ul style="list-style-type: none"> ▪ Developing standard operating procedures (SOP) for Voucher program administration ▪ Training ARDA admin personnel on SOP ▪ Liaising with certified EE-AF suppliers to establish standard protocols for data exchange (i.e. collection of used vouchers), including data on the profile of EE-AF users, as well as regular (quarterly) cash transfer arrangements ▪ Developing monitoring and reporting templates to Project Board and other partners ▪ Overseeing and managing implementation via the sub-contractor <p><u>Sub-activity 2.2.2: Providing consumer financing for EE-AF for households (Financial Partners)</u></p> <p>In parallel, project’s financial partners will design and offer to consumers complementary consumer loan products through which households can finance the remaining part of the up-front costs in EE stove and annual supply of AF. At the time of Funding Proposal development, Crystal Bank, one of the Georgia’s leading MFI, has indicated a strong commitment to collaborate with the project and take the risks of creating the market; other potential financial partners have indicated their interest to join at the later stages.</p> <p>Crystal will set up an EE stove instalment financing program. Under this program, Crystal will finance the purchase of an EE stove (net of the proposed 30% purchase subsidy through the Voucher program and a customer down payment of GEL 70, equivalent to the price of a traditional stove) through a 9-month loan, to be repaid in equal instalments. Crystal will realize an effective interest rate of 30% by negotiating with EE stove suppliers a discount (c.a 10%) on the purchase price (the instalment program will therefore be presented as 0% interest to consumers). The process envisages the following steps: (i) consumer applies for loan at Crystal branch; (ii) Crystal conducts credit review and approves loan; (iii) Crystal sends proceeds (less the supplier discount) to the supplier; (iv) Crystal collects monthly instalments (on the market price of stove plus embedded interest charges) from customers.</p> <p>The financing program can be extended to include the purchase of a 1-year supply of fuelwood (sustainably sourced from the new NFA fuelwood supply system (see Activity 1.3)) or USB produced by the suppliers incentivized under Activity 2.1.</p> <p><u>Sub-activity 2.2.3: Supporting MFIs and partner banks to structure and promote consumer financing products for EE-AF solutions (GIZ)</u></p>
--	---

	<p>The project will work with all interested MFIs and commercial banks to support the development of new consumer financing products for EE stoves, AF, and other emerging technical solutions (to be identified under Sub-Activity 2.1.3). For example, there is large potential and financing needs for building insulation works in residential sector. However, little sector information is available or exist regarding the costs of such projects, availability of skills and technical solutions and the resulting financial benefits for households. The project will be based on market analysis into residential sector potential for retrofits, training and knowledge transfer for banks on appraising investments (including risk assessment) and developing a pipeline of projects in residential sector (in conjunction with Activity 2.3). Loan for renewable energy system installation by households, such as SWH or heat pumps, will also be explored.</p>
Implementation mechanisms	<p>This Activity will be delivered by two Executing Entities (EEs) as follows and also illustrated at Figure 84 below:</p> <ul style="list-style-type: none"> ▪ Actions 2.2.1 will be implemented by ARDA ▪ Action 2.2.2 will be delivered by project’s financial partners, Crystal and other MFIs and commercial banks. ▪ Action 2.2.3 will be implemented by GIZ <p>Provision of the financial incentive will be result-based because ARDA will release the payment of the subsidy directly to suppliers of certified EE stoves upon them presenting the proof of EE stove sales to households (paid invoice and the voucher).</p>

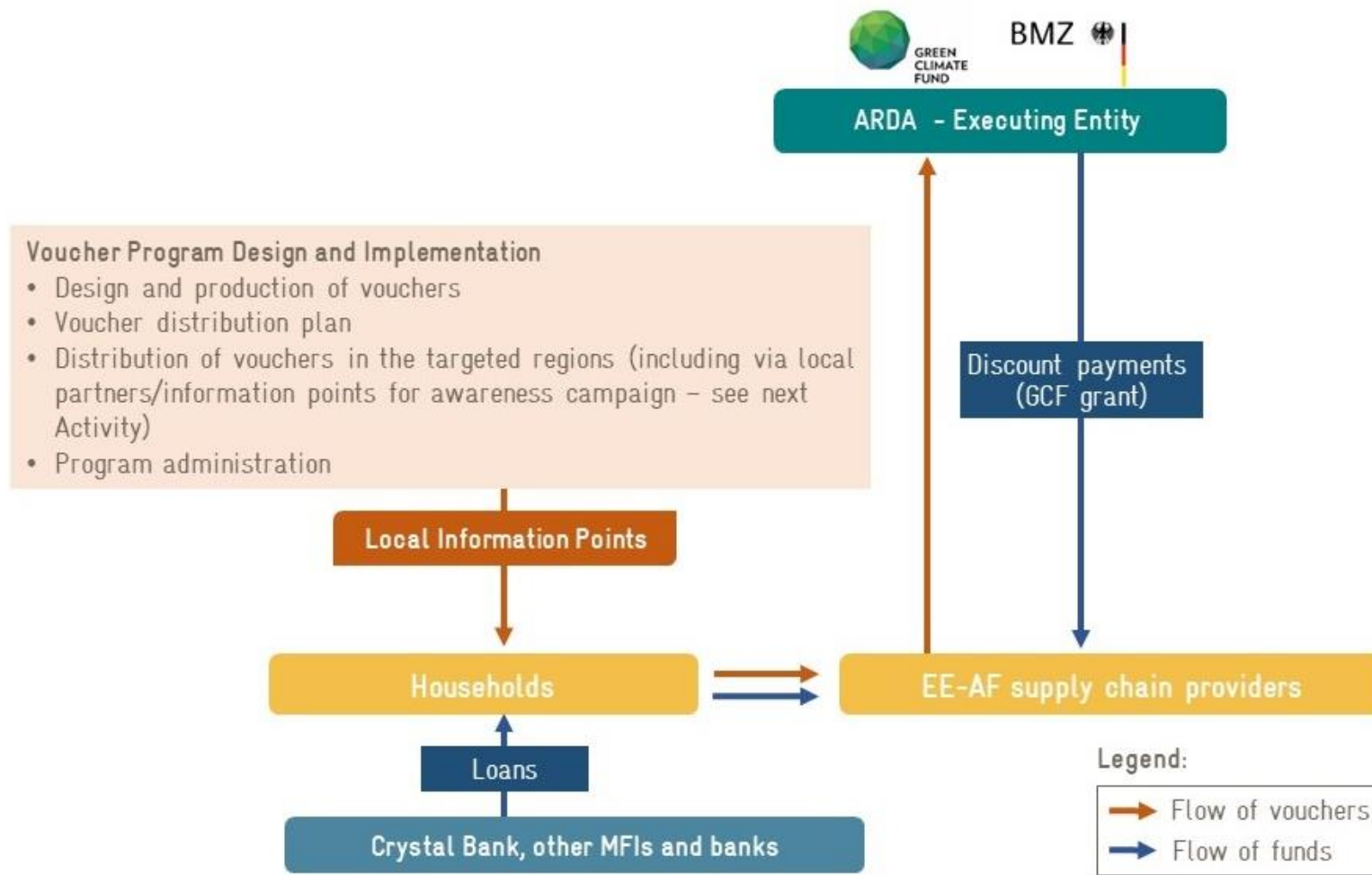


Figure 84: Implementation and Fund Flow arrangement for Activity 2.2

Fund flow arrangement	<p>In line with proposed implementation arrangements, the following arrangement for fund flows will apply:</p> <ul style="list-style-type: none"> ▪ Funds to deliver TA to build ARDA capacities for Voucher program administration will be provided by GIZ ▪ To implement action 2.2.1, GIZ will enter into a Subsidiary Agreement with ARDA. The Subsidiary Agreement will be legally binding and outline the detailed financial, procurement and implementation plan of the relevant elements of the project, including reporting and liability requirements. ▪ Co-financing under Action 2.2.2 will be administered by project's financial partners ▪ Sub-activity 2.2.3 will be delivered by GIZ
Co-finance / leverage	<p>Total Activity Cost: EUR 15.68 million</p> <ul style="list-style-type: none"> ▪ Total GCF finance: EUR 4.29 million <ul style="list-style-type: none"> ○ <i>Investments: Financial incentives for EE stoves</i> ○ <i>Technical assistance: Service provider to design and implement voucher scheme, international and national consultants and GIZ advisors to support ARDA and activities in 2.2.1</i> ▪ Co-finance Crystal Micro-finance: EUR 10.5 million EUR ▪ Co-finance BMZ: EUR 0.89 million EUR

6.4.2.3 Activity 2.3 Creating consumer awareness about EE-AF solutions and provision of technical advisory services for fuelwood users

Activity 2.3 Creating consumer awareness about EE-AF solutions and provision of technical advisory services for fuelwood users	
Contribution to GCF outcome(s)	M7.0 Lower energy intensity of buildings, cities, industries and appliances
Contribution to project output	Market Development for Energy Efficiency (EE) and Alternative Fuels (AF)
Activity description	<p>This Activity will provide extensive informational and technical advisory support to fuelwood users in the target regions and other locations across rural Georgia. This support will specifically cover a) provision of information about locally available EE-AF solutions; b) outreach and awareness raising about the implications of the forestry sector reform on fuelwood availability, price and available EE-AF alternatives, new supply chain of fuelwood via NFA (see Activity 1.3), as well as c) provision of technical advisory services to fuelwood users to help them identify and apply optimal EE-AF solutions in their households. This activity will involve close collaboration with regional and municipal authorities, trustees of the local communities, community-based organizations (CBOs), women groups and local NGOs. National organization, NGO or professional service provider, will be selected by GIZ through an open tender to implement this activity. GCF-BMZ funding will be used to finance awareness and advisory work in 3 target regions, while SIDA co-financing will enable replicating and scaling-up the same approach to other Georgia's regions.</p>

	<p>In the first stage, the project will reach out to and identify potential local partners, based on the stakeholder mapping conducted in the course of project preparation. It will organize a series of meetings to provide information about awareness and communication strategy on EE-AF and the opportunities for local organizations to participate in its implementation. The project [via nationally sub-contracted organization] will run a micro-grant program to select local partners and through them the establishment of the local information points (LIPs), i.e. public places where households and other fuelwood users can receive information about locally available EE-AF products, test/see them in operation, obtain contact information about EE-AF suppliers and financing options.</p> <p>In the next stage, once local partners are identified and LIPs are established, the project will work through them to provide information materials, facilitate networking with EE-AF suppliers and will use local partners as a platform to communicate with and receive feedback from local communities throughout project duration. Further, through established LIPs technical advisory services will be provided to fuelwood users, in the form of simple (walk-through) energy audits and other type of energy advice to help households and local SMEs identify optimal technical and financial solutions for EE-AF.</p> <p>Lastly, at the national level, the project will run country-wide awareness raising and PR campaign to be implemented by the Environmental Information and Education Centre (EIEC) on sustainable forest management, forestry reform agenda and its linkages with climate change and sustainable energy.</p>
<p>Description of sub-activities</p>	<p><u>Sub-activity 2.3.1: Community-mobilization, advocacy and advisory services on EE-AF to fuelwood users (GIZ and SIDA via nationally sub-contracted organization)</u></p> <ul style="list-style-type: none"> ▪ Inception meetings with local partners in the target regions (regional, municipal and forest authorities, CBOs, NGOs, women groups) to inform about the project and its advocacy and communication strategy on EE-AF, as well as modalities for local organizations to be involved ▪ Establishing data-base of fuelwood consumers in the target regions ▪ Undertake regular (annual) household surveys on EE-AF perception and awareness about alternatives to identify information and capacity gaps ▪ Developing advocacy and communication plan to reach out to at least 80% of fuelwood users/households, including list of communication materials, on-line platform for engagement and list of local partners ▪ Regular community meetings and advocacy events to inform about locally available alternatives and EE products based on developed communication plan ▪ Preparing and dissemination information materials ▪ Advise to local organizations on establishment of EE-AF local information points ▪ Provision of information/training to households on identification of feasible EE-AF solutions for households ▪ Energy audits and technical advice for households and local SMEs ▪ Advice on EE-AF product selection, cost-benefit analysis and financing options

	<p>A micro-grant competition will be organized among CBOs and other locally present organizations in the target regions to support the establishment of local information points. Grants will be assessed and awarded (in the amount of up to 10,000 EUR per proposal) against the following qualitative criteria:</p> <ul style="list-style-type: none"> ▪ Operational capacities of the applicants to run local information points (availability of space and staff) ▪ Range of EE-AF solutions to be promoted ▪ Established partnership with EE-AF suppliers and local community ▪ Vision regarding sustainability of information points ▪ Specific actions to involve women in the project. <p>LIPs will also provide information to local communities about BSYs to be established by NFA (Activity 1.3).</p> <p><u>Action 2.3.2: National advocacy and awareness raising (EIEC)</u></p> <p>As knowledge and public opinion will affect forestry policies and the social acceptance of the forestry reform agenda, public awareness and understanding of sustainable forest management and available EE/AF alternatives should be promoted at the national level. National advocacy and awareness campaign will be developed and implemented to communicate to a wider audience the objective and key elements of the forestry sector reform, SFM, linkages between climate change and sustainable energy, including:</p> <ul style="list-style-type: none"> ▪ Engaging youth and children in SFM campaign through forestry knowledge publicity, tree species identification, voluntary actions, knowledge competition, art performance, and essay contest ▪ Organization of forest visit programs for journalists, youth, and students (specifically in the three target regions) ▪ Writing and publishing forestry related stories targeting radio, newspapers and TV, as well as using social media such as Facebook, YouTube, Twitter, and Instagram for scaling outreach ▪ Production and dissemination of promotional items <p>Communicating GCF project results and impacts to a wider range of stakeholders in Georgia and the region, including Undertaking project impact and lessons learnt studies on the national campaigns</p>
Implementation mechanisms	<p>This activity will be delivered by two Executing Entities (EEs) as follows (Figure 85 and Figure 86):</p> <ul style="list-style-type: none"> ▪ Sub-activity 2.3.1 will be implemented by a sub-contractor, national or international NGO or professional organization experienced with managing complex grass-root operations in Georgia via GIZ as an EE ▪ One full time communication specialist/Task leader and support staff will be recruited by GIZ to oversee actions under this Activity, ensure coordination between sub-contractors and partners. Please refer to Figure 4 below for graphical illustration of the implementation arrangement for this Activity. ▪ Sub-activity 2.3.2: Environmental Information and Education Centre (EIEC) will act as Executing Entity

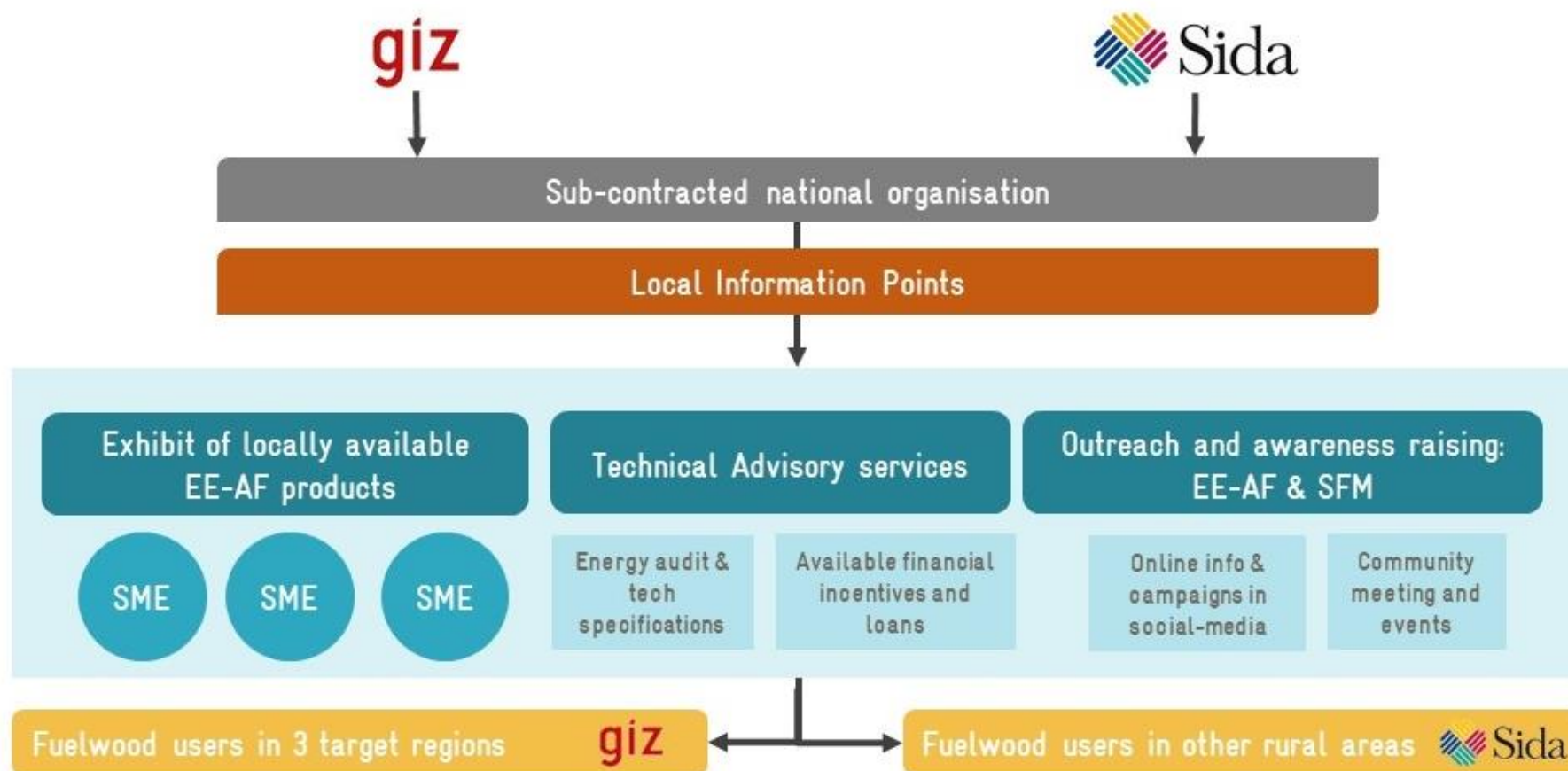


Figure 85: Implementation and Fund Flow arrangement for Activity 2.3.1

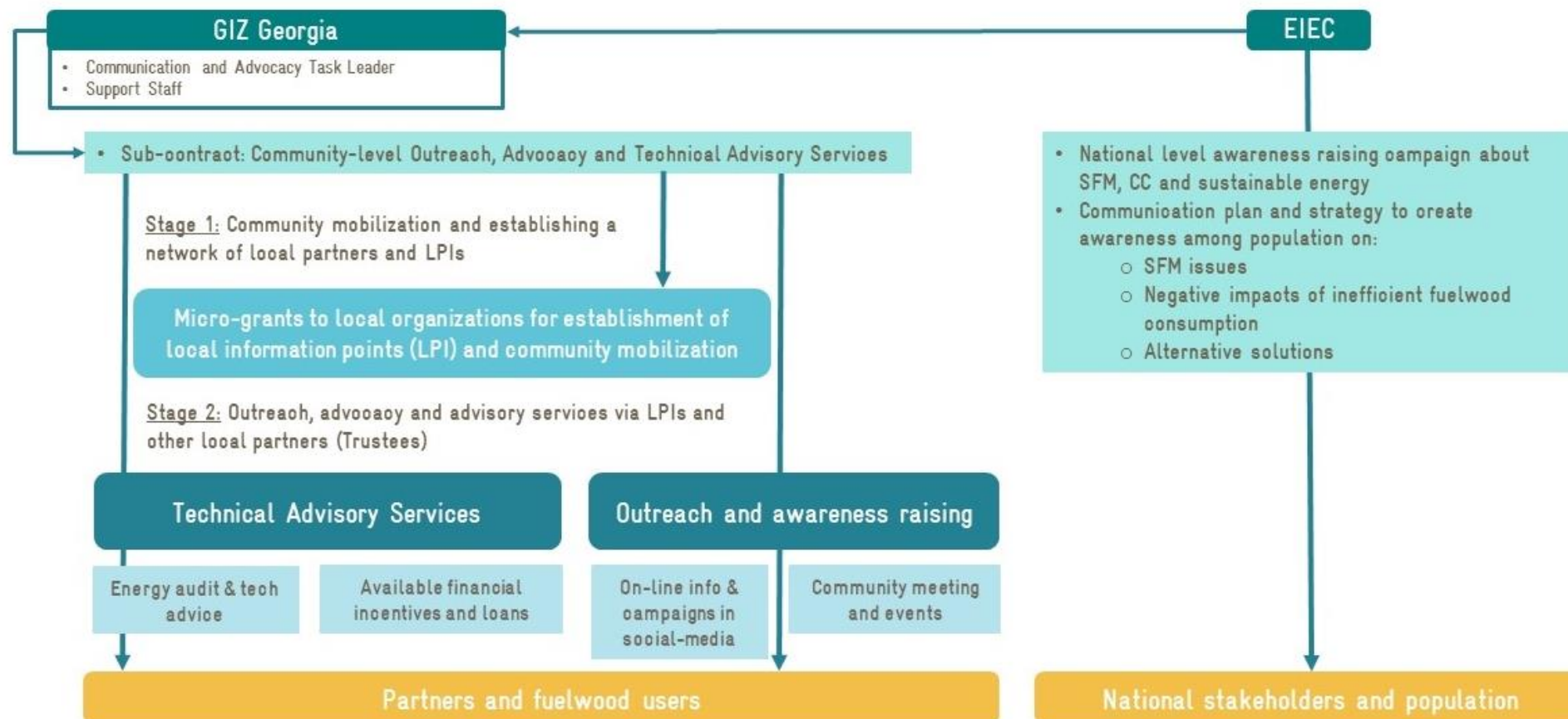


Figure 86: Implementation and Fund Flow arrangement for Activity 2.3.2

Fund flow arrangement	<p>In line with proposed implementation mechanisms, the following fund flow arrangements will apply:</p> <ul style="list-style-type: none"> ▪ Funds to deliver sub-activity 2.3.1 will be administered by GIZ directly ▪ SIDA co-funding for sub-activity 2.3.1 will be provided directly to a competitively selected sub-contractor (e.g. top-up arrangement for the contract signed by GIZ) ▪ GIZ will enter into a Subsidiary Agreement with EIEC. The Subsidiary Agreement will be legally binding and outline the detailed financial, procurement and implementation plan of the relevant elements of the project, including Sub-activity 2.3.2 National Advocacy and Awareness Campaign
Co-finance / leverage	<p>Total Activity Cost: EUR 4.33 million</p> <ul style="list-style-type: none"> ▪ Total GCF finance: EUR 1.99 million <ul style="list-style-type: none"> ○ <i>Technical assistance: national organization for implementation of 2.3.1, GIZ advisors, national and international experts for PR, awareness raising and communication</i> ▪ Co-finance Government: EUR 0.04 million ▪ Co-finance BMZ: EUR 0.72 million ▪ Co-finance SIDA: EUR 1.58 million

6.4.2.4 Activity 2.4 Enabling policies and regulations

Activity 2.4 Enabling policies and regulations	
Contribution to GCF outcome(s)	M7.0 Lower energy intensity of buildings, cities, industries and appliances
Contribution to project output	Market Development for Energy Efficiency (EE) and Alternative Fuels (AF)
Activity description	<p>This Activity will support implementation of the ambitious reform agenda of the Government of Georgia in the area of energy efficiency and renewable energy in line with its commitment as a member of the EU Energy Community which the country joined in 2017.</p> <p>Technical assistance will be provided to the relevant public authorities to accelerate transposition and practical implementation of those policy and regulatory instruments envisaged in the EE and RE acquis, which have direct relevance and implications for the EE-AF sector and reduction of the fuelwood consumption in rural areas.</p> <p>There are two key policy instruments which the project will support:</p> <ol style="list-style-type: none"> a) Introduction and enforcement of the energy efficiency and environmental standards and labelling scheme for EE heating appliances (stoves) in line with draft EE Law b) Introduction of the energy efficiency procurement in public sector, as per relevant provision of the EED, draft EE Law and NEEAP. <p>Ministry of Economy and Sustainable Development (MoESD) is the key governmental body in charge of developing and promoting Energy acquis and will be the primary partner and beneficiary of this Activity. Draft EE Law also stipulates that the National Energy Efficiency Action Plan (NEEAP) should be adopted by</p>

	<p>the Government and issued for a 3-year period, no later than 4 months after the adoption of the law.</p> <p>In addition, Public Procurement Agency of Georgia has been entitled by the Draft EE Law to integrate principles of energy efficiency public procurement in the public procurement practices in Georgia. MoESD and the Public Procurement Agency will be the main partners and beneficiaries under this Activity.</p>
Description of sub-activities	<p><u>Sub-activity 2.4.1: Capacity building for introduction and enforcement of energy efficiency and environmental standards and labelling for EE-AF solutions</u></p> <p>Draft EE Law calls for introduction of EE and environmental standards in line with relevant provisions of the EU's Ecodesign Directive. Once fully implemented, approximation of the Ecodesign Directive will over time force the inefficient stoves off the market. However, due to the missing framework and low level of technical capacities, the appliance ecodesign implementation will require extensive groundwork, in particular for domestically produced appliances, such as solid fuel local space heaters. That is why a phased approach is envisaged to introduction of standards and labels, with only a limited number of appliances subject to regulation in the first phase.</p> <p>Recognizing limited capacity of the Government and the market to simultaneously adopt and implement all Ecodesign directive regulations, the project will spearhead adoption of EE and environmental standards and labels specifically for heat stoves by:</p> <ul style="list-style-type: none"> ▪ Supporting MoESD in drafting and adopting of legislation and its delegated acts for EE standards and labels of solid fuel-based local space heaters; ▪ Identifying appropriate arrangements for stove testing and certification, in particular in view of the absence of such experience and capacities in Georgia (in parallel with Activity 2.1 which will support SMEs with stove certification); ▪ Capacity building of the appointed public agency for stove market surveillance, including product data-base, rapid screening methods to identify non-compliant products. The project will do so by providing technical advice, training and facilitating learning from experience and best practices from EU and other countries. ▪ Recommendations on establishment of the social support program for solid fuel local space heaters based on the results of Activity 2.2. <p><u>Sub-activity 2.4.2: Facilitating introduction of EE procurement practices in public sector</u></p> <p>In line with provisions of the EU EED, with regard to the purchase of certain products and services and the purchase and rent of buildings, governments which conclude public works, supply or service contracts should lead by example and make energy-efficient purchasing decisions. Georgia's Draft EE Law provides that the Legal Body of Public Law - Public Procurement Agency – shall elaborate rules and guidelines on implementation of Energy Efficiency in the public procurement, considering consistency with cost-effectiveness, economic feasibility, wider sustainability, technical suitability.</p> <p>The project will support the Public Procurement Agency of Georgia in the following areas:</p>

	<ul style="list-style-type: none"> ▪ Development of secondary legislation on Energy Efficient Public Procurement (EEPP) ▪ Development of the National Guideline on EEPP, including appropriate methodologies, templates, case studies, etc. to aid with practical application of the EEPP ▪ Provision of training and capacity building for public procurement authorities on EEPP application, including through familiarization with international best practices and approaches to EEPP ▪ Pilot application of the EEPP in target regions, the support includes: the preparation and finalization of procurement documentation (tender dossiers, evaluation reports, draft contracts); attendance to pre-tender meetings, bid opening ceremonies (as observer) and clarification/negotiation meetings. ▪ Advocacy and awareness raising on energy efficient procurement among PPA staff, public procurement authorities, vendors and population at large <p>Currently, the public sector's annual consumption of fuelwood is around 87,000 m³ and the around GEL 1.1 million is being spent on procuring fuelwood for public needs. In line with the EED vision, the project will support public sector to lead by example and demonstrate how through application of EEPP this demand can be gradually reduced. The project will assist public authorities (focusing on the target regions first) to prepare and run public procurement of the fuel supplies, as well as procurement of renovation and repairs works in public buildings in line with adopted EEPP guidelines. It will work with the public procurement authorities to ensure that the process follow the public procurement rules established in Georgia and set example for implementation of EEPP principles.</p>
Implementation mechanisms	<ul style="list-style-type: none"> ▪ GIZ will implement this activity by procuring services of professional organizations
Fund flow arrangement	<ul style="list-style-type: none"> ▪ GIZ as Executing Entity
Co-finance / leverage	<p>Total Activity Cost: EUR 1.68 million</p> <ul style="list-style-type: none"> ▪ Total GCF finance: EUR 0.31 million <ul style="list-style-type: none"> ○ Technical assistance: GIZ advisors, ○ GCF investment will cover provision of technical assistance (international and national consultants, training costs and study tour) ▪ Co-finance Government: EUR 0.009 million ▪ Co-finance BMZ: EUR 1.34 million

6.4.3 Component 3: Livelihood opportunities and local-self-governance in forest management⁵¹⁶

This Component ensures a just and participatory transition to the new approach of managing forests sustainably in its social, economic and ecological functions with the ultimate goal to reduce pressure on forest areas.

⁵¹⁶ Please note: The details of Component 3 will be developed until March 2021.

Under the forest sector reform, the fuelwood supply mechanism and timber harvesting will be the sole responsibility of the NFA. Up to now, members of local communities depend partly on informal or illegal wood harvesting activities as source of income – a livelihood opportunity, which will disappear in the near future. At the same time, the new forest code and the new National Principles, Criteria and Indicators for Sustainable Forest Management put a much stronger focus on economic benefit sharing and participation of local authorities and population in forest management.

These activities lead on the one hand to a more active participation of local authorities and local population in decision-making, SFM implementation and dispute settlement and thus to a more just transition. On the other hand, through increased education and value chain development the local population benefits from diversified, legal employment and business opportunities and thus increased incomes.

This Component will utilize technical assistance to implement the activities. The Component is solely financed by a SDC grant.

Component 3: Livelihood opportunities and local-self-governance in forest management	
Contribution to GCF outcome(s)	M7.0 Lower energy intensity of buildings, cities, industries and appliances
Component / Activity description	<p>The objective of this component is to ensure a just and participatory transition to the new approach of managing forests sustainably in its social, economic and ecological functions with the ultimate goal to reduce pressure on forest areas. It consists of four activities:</p> <ul style="list-style-type: none"> ▪ Activity 3.1: Strengthening technical capacities of municipalities and citizens to engage in forest management and conservation ▪ Activity 3.2: Introducing participation and interest protection mechanisms in order to ensure a transparent and inclusive forest management planning and implementation ▪ Activity 3.3: Developing professional skills and knowledge for forest management and conservation through vocational education and international university partnerships with centers of knowledge ▪ Activity 3.4: Supporting the transition from informal fuelwood related income sources to formal livelihood options of various forest-related value chains
Implementation mechanisms	<ul style="list-style-type: none"> ▪ The implementation of this Component and its Activities will be led by GIZ. GIZ will provide technical assistance for the implementation of these Activities. ▪ Close coordination will be sought with other institutions (NFA, ARDA, DES, VET colleges, forest-related faculties of universities, NGO/CSOs, as well as local municipalities).
Fund flow arrangement	SDC will enter into a co-financing agreement with GIZ. The agreement is legally binding and outlines the detailed financial, procurement and implementation plan of the relevant elements of the project, incl. reporting and liability requirements.
Budget and co-finance	<p>Total Activity Cost: EUR 4.09 million (SDC finance)</p> <ul style="list-style-type: none"> ▪ No GCF finance towards this component ▪ Co-finance Government: (tbd)

--	--

6.5 Synergies with other government initiatives

The following Figure demonstrates how the project will complement other government initiatives.

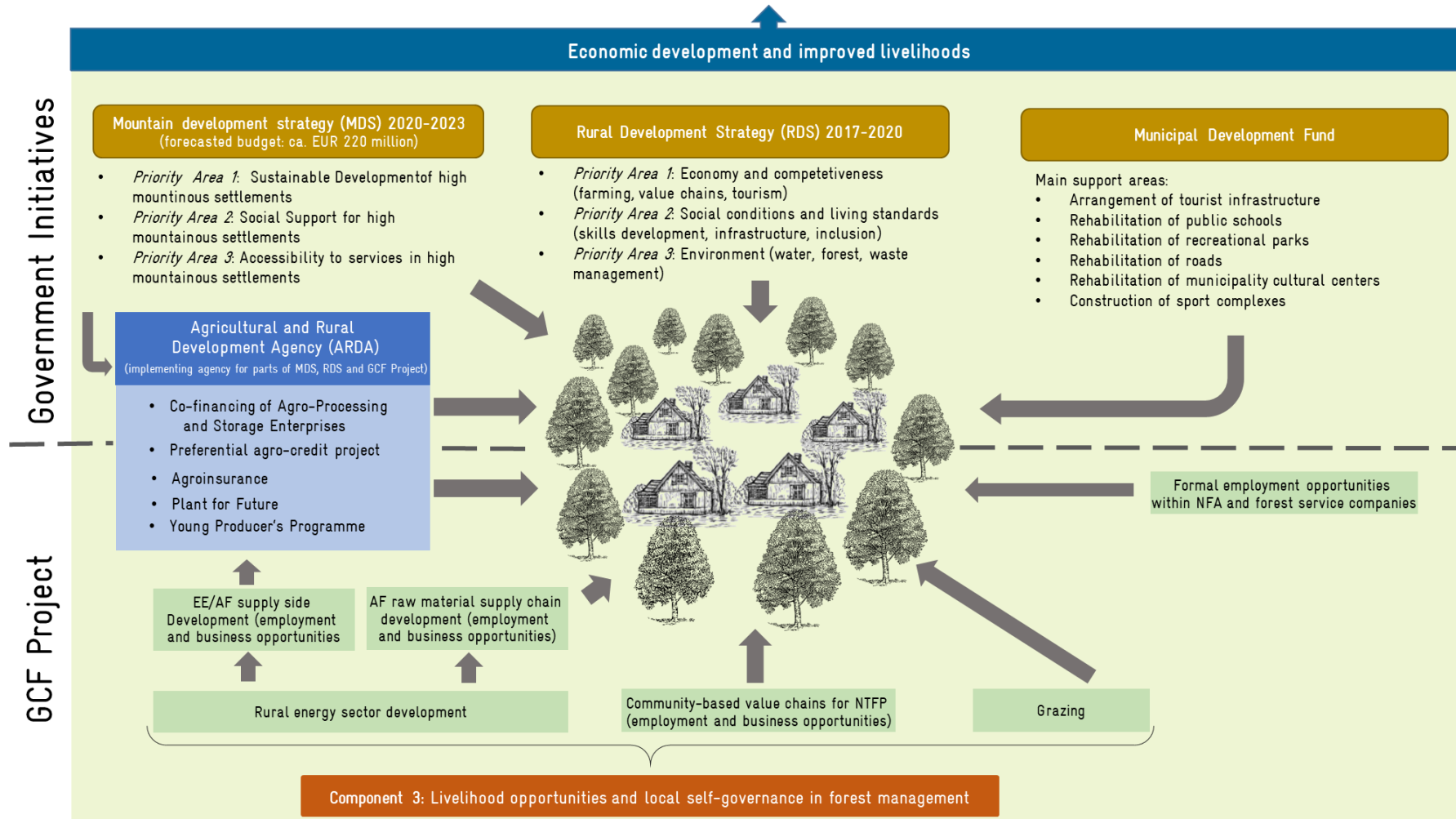


Figure 87: Synergies between the GCF project and government initiatives

6.6 Project logical framework

E.1. Paradigm shift objectives		
<input checked="" type="checkbox"/> Shift to low-emission sustainable development pathways <input type="checkbox"/> Increased climate resilient sustainable development		
E.2. Core indicator targets		
E.2.1. Expected tonnes of carbon dioxide equivalent (tCO ₂ eq) to be reduced or avoided (mitigation only)	Annual	805,000 tCO ₂ eq
	Lifetime ⁵¹⁷	16.14 million tCO ₂ eq
E.2.2. Estimated cost per tCO ₂ eq, defined as total investment cost / expected lifetime emission reductions (mitigation only)	(a) Total project financing <u>177.69 million</u> Euros (b) Requested GCF amount <u>32.79</u> million Euros (c) Expected lifetime emission reductions <u>16.14 million</u> t CO ₂ eq (d) Estimated cost per tCO₂eq (d = a / c) <u>11.06</u> Euros / t CO ₂ eq (e) Estimated GCF cost per tCO₂eq removed (e = b / c) <u>2.0</u> Euros / t CO ₂ eq	
E.2.3. Expected volume of finance to be leveraged by the proposed project/programme as a result of the Fund's financing, disaggregated by public and private sources (mitigation only)	(f) Total finance leveraged <u>184.71 million</u> Euros (g) Public source co-financed ⁵¹⁸ <u>61.40 million</u> Euros (h) Private source finance leveraged ⁵¹⁹ <u>123.57 million</u> Euros (i) Total Leverage ratio (i = f / b) <u>1:6</u> (j) Public source co-financing ratio (j = g / b) <u>1:2</u> (k) Private source leverage ratio (k = h / b) <u>1:4</u>	
E.2.4. Expected total number of direct and indirect beneficiaries, (disaggregated by sex)	Direct	98,337, 52% of female (51,135 women)
	Indirect	1,000,000, 52% of female (520,000 women)
	Direct beneficiaries are considered to be the recipients of the project-funded financial incentive for EE stove, which will target 30% of the fuelwood consuming households in the target regions, i.e. 30,370 HHs. The number of direct beneficiaries has been calculated assuming average size of a Georgia household to be 3.2 ⁵²⁰ . Indirect beneficiaries are considered to be the people to receive information and advisory support through the project. The number has been calculated in line with target for corresponding activities in the project logframe.	
	Direct	3,7% (1.9% female)

⁵¹⁷ Over 20 years of investment life-time.

⁵¹⁸ Including confirmed co-financing from Crystal Bank for EE stoves and AF loans.

⁵¹⁹ Including reinvestment of NFA revenues - see Annex 3 Financial and Economic Analysis.

⁵²⁰ GEOSTAT 2018

E.2.5. Number of beneficiaries relative to total population (disaggregated by sex)	Indirect	27% (14% female)
--	----------	------------------

Table 66: Logical framework – fund-level impacts (Section E.3 of the Funding Proposal)

Expected Results	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term (end-of year 4)	Final	
M4.0 Reduced emissions from land use, reforestation, reduced deforestation, and through sustainable forest management and conservation and enhancement of forest carbon stocks	M4.1 Tonnes of carbon dioxide equivalent (t CO ₂ eq) reduced or avoided (including increased removals) - forest and land use	<p><i>Government Sources:</i> Biennial update report to the UNFCCC FIMS activity logs</p> <p><i>Project Sources:</i> Project M&E</p>	0 tCO ₂ eq	3.13 million tCO ₂ eq	5.3 million tCO ₂ eq	GHG estimates are based on the 7-year GCF project duration. Additional GHGs will be reduced during the project's lifetime (20 years), leading to 16.14 million tC202eq over lifetime (see Section D.1. ⁵²¹)

⁵²¹ For more detail on the methodology and assumptions, also refer to the Feasibility Study Chapter 9.1.

Table 67: Logical framework – fund-level outcomes (Section E.4 of the Funding Proposal)

Expected Outcomes	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term)	Final	
M6.0 Increased number of small, medium and large low-emission power suppliers	<i>M6.2 Number of households and individuals (males and females) with improved access to low-emission energy sources</i>	Annual reports from the Voucher Program under Activity 2.2	< 1,000 HHs	10,200 HHs; 32,640 beneficiaries (15,667 male and 16,973 female)	30,730 HHs; 98,337 beneficiaries (47,202 male and 51,135 female)	Voucher Program provides sufficient incentives to jump-start demand for EE solutions
M9.0 Improved management of land or forest areas contributing to emissions reductions	<i>M9.1 Hectares of land or forests under improved and effective management that contributes to CO2 emission reductions</i>	Forest management plans approved by MoEPA Annual use plans approved by MoEPA	0 ha	130,000 ha	270,807ha	Forest code approved and secondary legal acts revised prior to project start No delays in developing and approving SFM plans

Table 68: Logical framework – project performance indicators (Section E.5 of the Funding Proposal)

Expected Results	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term	Final	
Result 1: Reduced forest degradation and enhanced timber stocks.	I1.1: Rate of forest degradation: Baseline degradation rate in % of biomass lost, project reduction of degradation in tCO ₂ /ha/year	1) FMP and activity records of NFA 2) Annual growth model-based update of the forest resource database (FIMS) (Volume, biomass, carbon) 3) Verification in the field: Annually by DES supervision of implemented activities.	Historical degradation: 26% biomass lost Conservative baseline scenario: 15% biomass lost Detailed baseline to be provided with new/update of FMPs.	Reduction of forest degradation compared to baseline: 1.3 tCO ₂ /ha/year; results in per ha reduction of 5.2 tCO ₂ /ha after 4 years	Reduction of forest degradation compared to baseline: 1.3 tCO ₂ /ha/year; results in per ha reduction of 9.1 tCO ₂ /ha after 7 years	The baseline and targets are calculated on basis of the forest model elaborated for project design ⁵²²
	I1.2: Change in long-term average forest biomass in tCO ₂ /ha and project carbon increase in tCO ₂ per ha and year	In year 7: Systematic field control if SFM measures are successfully applied in all 8 districts, followed by model-based recalculation of indicators I1.1 and I1.2	Long-term average baseline forest carbon: 228 tCO ₂ /ha Detailed baseline to be provided with new/update of FMPs.	Increase in forest biomass 2.9 tCO ₂ /ha/year; results in per ha increase of 11.6 tCO ₂ /ha after 4 years	Increase in forest biomass 2.9 tCO ₂ /ha/year; results in per ha increase of 20.4 tCO ₂ /ha after 7 years	
	I1.3: NFA capacitated to implement sustainable forest management activities following the	NFA monitoring reports, FIMS activity	<i>Low capacity:</i>	<i>Medium capacity:</i>	<i>High capacity:</i>	Procurement of equipment and services by NFA to capaci-

⁵²² Described assumptions included in Feasibility Study Chapter 5.2.3.4.2 & see Risk 1 in Section G below

	performance-based grant mechanism schedule	recording and monitoring	<p>No FMP approved according to new approach</p> <p>Implementation of forest management measures (forest road construction, thinning and harvesting, restoration etc.) at 0.3 to 19 % (depending on measure).</p>	<ul style="list-style-type: none"> 8 FMPs approved according to new approach Implementation of forest management measures (forest road construction, thinning and harvesting, restoration etc.) at 25-35% (depending on measure). 	<ul style="list-style-type: none"> FMPs implemented according to schedule Implementation of forest management measures (forest road construction, thinning and harvesting, restoration etc.) at 100 %. 	tate the forest implementation teams is not delayed significantly.
Result 2: Fuelwood supply switch from illegal outtakes to sustainable level of outtakes by NFA for the population of the 3 target regions.	I2.1: Cubic meters (m ³) of fuelwood sustainably harvested by NFA in the 8 districts ⁵²³ applying eco-system-based forest management practices in year 7 of project implementation.	Annual plans, harvested fuelwood intake records, BSY records, ⁵²⁴ Information recorded by FIMS modules for tracking and recording timber harvests	50,489m ³	169.917m ³	285,575m ³	NFA reaches the sustainable level of fuelwood outtake of 285,575 m ³ in the 8 districts with 100% of implementation capacity in year 7. Population purchases fuelwood from NFA and does not use illegal sources.
	I2.2: Residential fuelwood consumption reduced for 3 target regions ⁵²⁵	Residential energy use survey in the target regions	725,000m ³	633,000m ³	366,000m ³	EE-AF market development trends are consistent with projections.

⁵²³ There are 14 forest districts in the 3 target regions. Of those 14 districts, SFM measures will be implemented by NFA in 8 districts within the framework of GCF-supported project. The total fuelwood supply in the target region will come from 8 pilot districts and 8 additional forest districts in the target regions.

⁵²⁴ Registration of harvested timber, sale receipts.

⁵²⁵ Please note: The figures are for the total of the 3 regions, covering 14 forest districts, whilst the NFA harvest figures in I2.1 are for the 8 target districts the project is working in.

						Forest supervision measures are effective and there is no spillover effect (i.e. illegal withdrawal and sales to other regions/consumers)
Result 3: Self-sustaining level of growth of EE-AF market reached (30% market share for EE stoves / 15% market share for AF)	I3.1: Market volume of sold stoves and AF	Annual reports from the Voucher Programme under Activity 2.2 and energy use survey at mid-term and project end (see Result 2).	< 1,000 stoves and 3,500t AF	10,200 stoves and 8,600t AF	30,730 stoves and 28,600t AF	Manufacturers of EE stoves & AF have sufficient capacity to ensure supply of certified products on the market
	I3.2: Volume of investment (EUR) in EE-AF production sector, disaggregated by sources and instruments (loans, equity, grants)	ARDA portfolio analysis	0 - grants < EUR 0.1 million loans < EUR 0.1 million equity	EUR 0.8 million -grants EUR 1.8 million– loans EUR 0.2 million – equity	EUR 1.1 million -grants EUR 2.5 million– loans EUR 0.3 million – equity	Accelerated increase in market demand for EE-AF solutions (i.e. up to 40-50% per annum) as a result of forestry sector reform and limited availability of cheap fuelwood
	I3.3: Investments leveraged (EUR) in EE stoves, disaggregated by source	EE stoves: Voucher Programme Monitoring / Energy use survey at mid-term and by project end (see result 2)	< EUR 0.1 million from HHs 0 – from financial sector	EUR 0.3 million– from HHs; EUR 2.6 million - from financial sector in the form of loans	EUR 0.7 million– from HH EUR 6.5 million– from financial sector in the form of loans	Financial sector responds proactively to new market segment and offer appropriate and affordable consumer financing products
Result 4: Roll out of SFM and continuous EE-AF market development secured via enabling	I4.1: Provisions of Forest Code mainstreamed into secondary regulations and applied in practice	Analysis of secondary regulations	Secondary regulatory framework does not entail SFM provisions of the new Forest Code	Secondary regulatory framework entails SFM provisions of the new Forest Code	Secondary regulatory framework implemented accordingly by forest management bodies in Georgia in the following elements: All new FMPs	Political commitments to implementation reform remain high on the agenda of the Government of Georgia

regulative framework		<p>Analysis of FMP approval record of MoEPA</p> <p>Analysis of DES forest supervision cases on compliance with forest management principles by forest management bodies</p> <p>Analysis of education and training curricula</p>			<p>in Georgia developed according to new approach 70% of reforestation, afforestation and forest maintenance is done according to regulations in the forest districts, which started implementation of new FMPs in Georgia</p> <p>All educational and training centres for forest workers have included SFM approach in their curricula</p>	
	14.2: Functioning enabling regulative framework to ensure sustainability of EE-AF market developments via obligatory technology standards and favorable public procurement regulations	<p>Government annual report on the status of approximation and implementation of the EU Ecodesign Directive (as per Georgia's obligation under Energy Community Treaty)</p> <p>Annual report of the Public Procurement Agency</p>	<p>Implementation of Ecodesign Directive, including EE standards for heat stoves, are included in the draft Climate and Energy Action plan for 2021-2030 (under preparation) scheduled to be adopted in 2020</p>	<p>Standard approved by Government</p> <p>Public procurement regulations adopted</p>	<p>30% of new stoves in the target regions are compliant with the new standard (stove types/brands officially certified)</p> <p>Public procurement regulation applied in 3 target regions</p>	<p>Georgia fulfills its commitments under the Energy Community Treaty, including timely adoption of the EE Law and corresponding by-laws, e.g. primary regulation for transposition of the Ecodesign directive as a precondition for adoption of standards and regulations</p>

			Introduction of the energy efficiency procurement regulations in the public sector is part of approved NEEAP.			
Result 5: Livelihood opportunities are diversified and local self-governance in forest management is strengthened, leading to reduced pressure on forests	To be defined	To be defined	To be defined	To be defined	To be defined	To be defined

Table 69: Logical framework – activities (Section E.6 of the Funding Proposal)

Activity	Description	Sub-activities	Deliverables
1.1 Development and implementation of sustainable forest management plans in Guria, Kakheti and Mtskheta-Mtianeti	This Activity supports the implementation of sustainable forest management practices in 8 forest districts by a) the elaboration of 10 year sustainable forest management plans (FMPs) for eight target districts, based on forest management inventories, data analysis, and multi-stakeholder consultations and b) by the implementation of active interventions on 170,539 ha, including restoration and maintenance (incl. fire, pest and disease management, restoration and reforestation measures), cutting operations (maintenance and final cuts), and the construction of resilient forest infrastructure, among other activities. SFM will result in reduced forest degradation, the sustainable production and harvesting of fuelwood for the rural population, and further enhancement of forest carbon stocks.	1.1.1 Development of sustainable forest management plans based on the principles of SFM in selected forest districts 1.1.2 Implementation of SFM management plans in selected forest districts	<ul style="list-style-type: none"> 4 gender-sensitive business plans developed for Lanchkhuti, Ozurgeti, Chokhatauri and Akhmeta (Q4, year 1) Start of implementation of approved FMPs in Lanchkhuti, Ozurgeti and Chokhatauri districts in Guria, and Akhmeta district in Kakheti (Q4, Year 1) 4 gender-sensitive FMPs approved and 4 business plans developed for Kvareli, Telavi, Dedoplistskaro and Tianeti districts (Q4, Year 2) Start of implementation of approved FMPs in Kvareli, Telavi, Dedoplistskaro and Tianeti districts (Q1, Year 3) 3 tranches of equipment purchased for NFA (Q2 year 1, Q1 year 3, Q1 year 5) 526 NFA staff trained in target districts
1.2 Strengthening of forest supervision	The Activity supports the Department of Environmental Supervision (DES) to reduce the illegal use of forested areas, including illegal logging for fuelwood and industrial timber. The project supports DES to develop standard operating procedures, to train their staff and to equip DES with suitable equipment	1.2.1 Strengthening of procedures, standards, systems for enhanced forest supervision 1.2.2 Implementation of improved forest supervision measures and technologies	<ul style="list-style-type: none"> Standard operating procedures for forest patrol staff developed (Q3, year 1) Forest supervision teams⁵²⁶ in the three target regions equipped with adequate equipment, technology, and vehicles (Q4, Year 1) 8 DES trainers trained to conduct training modules for DES staff (including gender equality component)

⁵²⁶ For specification of equipment technologies and vehicles, see FS Chapter 5.2.3.2

	and technology (e.g. drones, GPS devices for registered logging trucks, satellite cameras, etc.). This improves the efficiency and effectiveness of forest supervision and law enforcement. As a final result forest degradation is reduced, and NFA revenues increase through eliminating illegal forest use.		<ul style="list-style-type: none"> ▪ 807 DES staff members trained on standard operating procedures, protocols and guidelines, including gender-specific forest and fuel use (Q1, Year 2) ▪ 306 forest patrol staff trained on best practices, equipment and technology for forest supervision (Q1, Year 2) ▪ 20 forest inspectors trained on best practices, and technology for improved forest inspections and evaluation of damages in forest ecosystems (Q3, Year 2)
1.3 Provision of sustainably produced fuelwood by NFA	This Activity supports NFA to establish a model sustainable fuelwood supply chain in 8 target districts within 3 regions. It supports NFA in the development and operation of Business Service Yards (BSY) by construction of the yards, purchase of equipment, training BSY staff, supporting operational planning, and ensure active monitoring of the yards. As a result, it facilitates the transition from the social wood programme to a new system of NFA-run 'BSYs' for fuelwood supply, which increase transparency and traceability in the forestry sector, and ensures harvesting levels are based on SFM.	1.3.1 Support to new mechanism for fuelwood provision to local population 1.3.2 Establishment of business service yards (BSY)	<ul style="list-style-type: none"> ▪ Selection of 14 BSY sites (Q4, year 1) ▪ SOPs, protocols and guidelines (gender-sensitive) for BSYs elaborated (Q4, Year 1) ▪ 15 BSYs operational through the project (Q2, Year 3) ▪ 90 BSY staff trained on SOPs, protocols, and wood marketing (Q3, Year 3) ▪ 50 NFA staff (in addition to BSY staff) trained on fuelwood and timber marketing
1.4 Enhancement of enabling environment for the nation-wide implementation of SFM	This activity strengthens the enabling environment to facilitate the nation-wide adoption of SFM. The project provides targeted support for adjusting the regulatory framework, improving forest sector training and vocational education, strengthening cross-sectoral planning through the establishment of a multi-stakeholder platform and high-	1.4.1 Strengthening of the legal framework for SFM 1.4.2 Improvement of sector steering and coordination between adjoining sectors 1.4.3 Development of online knowledge management and training platform for DES, NFA and MoEPA	<ul style="list-style-type: none"> ▪ Secondary legal act on the commercial use of NTFPs elaborated (Q4, Year 2) ▪ At least 1 multi-stakeholder plenary meeting per year for the forest sector reform platform (7 in total) ▪ Knowledge management and training platform established for MoEPA, DES, NFA and private forest service companies (Q3, Year 2)

	level inter-ministerial working group. Finally, climate risks and suitable adaptation strategies in forest ecosystems in the 3 project regions will be assessed to inform sector planning and forest management, where the results will be mainstreamed into sector policies, trainings and guidelines, as well as FMPs.	1.4.4 Improvement of vocational education and training for the forest sector 1.4.5 Enabling improved integration of climate change adaptation in forest sector planning, management and monitoring	<ul style="list-style-type: none"> ▪ 3 reports on climate risks for forest ecosystems in Guria, Kakheti and Mtskheta-Mtianeti⁵²⁷ (Q2, Year 3)
1.5 Improvement of monitoring and measurement, reporting and verification (MRV) systems for the forest sector	The Activity supports the development of a Forest Information and Monitoring System (FIMS), aligned with national MRV requirements by elaborating and operationalizing 10 FIMS modules and developing national emission factors. These will be utilized by (at least) 6 government institutions to sustainably manage and monitor Georgia's forest resources. The system improves the monitoring of forest resources, facilitating a more accurate monitoring of forest carbon stocks and other forest dynamics, which ultimately improves sector planning and forest management.	1.5.1 Strengthening of the national forest monitoring and MRV architecture 1.5.2 Development of FIMS modules and training end-users	<ul style="list-style-type: none"> ▪ 1 set of national emission factors and Georgia-specific allometric equations developed (Q2, Year 3) ▪ Institutional framework, SOPs, and protocols for FIMS (incl. clear institutional arrangements) established (Q2, Year 2) ▪ FIMS technical units formed and trained ▪ 10 FIMS software modules are developed and operational (Q4, Year 3) ▪ Help desk and support facility established and operational ▪ 36 FIMS end users are trained on FIMS (including staff from 9 regional offices, NFA, DES, MoEPA, APA, AFA, among others) ▪ 6 government institutions are trained and use FIMS (Q4, year 4)
Activity 2.1 EE-AF supply chain development	This activity facilitates the creation and expedited growth of the supply chain for EE and low-carbon AF solutions. It will do so by providing technical assistance and investment support in the form of grants, interest rate subsidy and guarantees (co-financed) to	2.1.1 Establishing Technical Assistance and Investment Support Facility (TAISF) 2.2.2: Feasibility assessment and pipeline development for new EE-AF solutions	<ul style="list-style-type: none"> ▪ Data-base of EE-AF suppliers established ▪ First certified product available on the market (Q4, Year 1) ▪ Trainings/coaching sessions to min 100 employees of EE-AF supply chain stakeholders delivered (min 30% female representation)

⁵²⁷ Including the identification of suitable adaptation strategies to be mainstreamed into annual plans, FMPs, as well as regional and national strategies.

	existing and new EE-AF producers, as well as supporting development a pipeline of investment projects for new and emerging EE-AF solutions. Through this activity EUR 3.8 million of additional investment in EE-AF sector will be leveraged leading to 40-50% market growth rate in the volume of sales (currently 500 EE stoves/year and 3,500 t USB/year).		<ul style="list-style-type: none"> ▪ Business plans for investment in EE-AF production developed ▪ Investment support to EE-AF suppliers provided: <ul style="list-style-type: none"> - 70% of the estimated market needs (Q4, Year 4) - 100% of the estimated market needs (Q4, Year 7) ▪ Feasibility studies for new EE-AF solutions and products developed
Activity 2.2 Implementing consumer financing instruments for EE-AF solutions	This Activity jump-starts the market and scaling-up demand for EE-AF products. It provides, in partnership with national financial organizations, local banks and MFIs, a package of consumer financing options (loans and financial incentives) focusing initially on EE stoves and briquettes, but gradually expanding to other EE-AF technologies. By project end, this activity will provide 30,370 households with structured financing products enabling the purchase of an EE stove and over 25,000 households – for the annual supply of AF.	<p>2.2.1: Design, implementation and marketing of the voucher programme for EE stoves for households</p> <p>2.2.2: Providing consumer financing for EE-AF for households</p> <p>2.2.3: Supporting MFIs and partner banks to structure and promote consumer financing products for EE-AF solutions</p>	<ul style="list-style-type: none"> ▪ Voucher Programme has started (Q4, year 1) ▪ Gender impact assessment of viability of financing schemes for stoves to ensure that loans and micro credits are accessible for women, especially women-led households and single parents ▪ Consumer financing products launched for EE stoves and briquettes (Q4, Year 1) ▪ Voucher programme finalised (with at least 25% of beneficiaries being women-headed households) (Q4, Year 6) ▪ Consumer financing products launched for other EE and AF solutions (Q4, Year 5)
Activity 2.3 Creating consumer awareness about forest sector reform, EE-AF solutions and provision of technical advisory services for fuelwood users	This activity creates awareness among fuelwood users and Georgia's population at large about forestry sector reform process, its implications, as well as alternatives to fuelwood. It will involve the provision of informational and technical advisory support to fuelwood users in the target regions and other locations across rural Georgia, as well as undertaking a nation-wide awareness raising campaign. As a result, 82,000 households will be	<p>2.3.1: Community-mobilization, advocacy and advisory services on EE-AF to fuelwood users</p> <p>2.3.2: Establishing local Information points</p> <p>2.3.3: National advocacy and awareness raising</p>	<ul style="list-style-type: none"> ▪ Data-base of fuelwood consumers in the target regions established (Q4 Year 1) ▪ Advocacy and communication plan including gender-sensitive approach developed ▪ Gender-sensitive knowledge and information materials developed ▪ Local information points (LIP) established (Q2 Year 2): <ul style="list-style-type: none"> - 19 LIPs in target regions - 30 LIPs in other regions across Georgia

	supported in the target regions, 160,000 households in other rural regions and at least 1 million people will be reached nationally. It is expected that the share of people supporting the main direction of the forestry sector reform will increase by at least 50%.		<ul style="list-style-type: none"> ▪ Annual reports on information provision and technical advisory support to fuelwood users published ▪ Gender-sensitive nation-wide awareness raising campaign finalised (Q3, Year 6)
Activity 2.4 Enabling policies and regulations for EE-AF sector	<p>This Activity provides technical assistance to public authorities to accelerate transposition and practical implementation of policy and regulatory instruments envisaged in the EE and RE acquis, which have direct relevance and implications for the EE-AF sector and reduction of the fuelwood consumption in rural areas, namely:</p> <ul style="list-style-type: none"> ▪ energy efficiency and environmental standards and labelling for space heaters in line with EU Ecodesign directive ▪ energy efficiency public procurement rules and regulation. <p>The objective is to create an enabling policy and regulatory framework for sustained EE-AF sector growth beyond GCF project timeframe.</p>	<p>2.4.1: Capacity building for introduction and enforcement of energy efficiency and environmental standards and labelling for EE-AF solutions</p> <p>2.4.2: Facilitating introduction of EE procurement practices in public sector</p>	<ul style="list-style-type: none"> ▪ Standards for EE stove /secondary regulation drafted (Q4, Year 1) and adopted (Q4, Year 4) ▪ Certification and labelling scheme for EE stoves developed (Q4, Year 1) and officially adopted (Q4, Year 4) ▪ Market surveillance and MRV system established (Q4, Year 4) ▪ Secondary regulation on EE public procurement adopted (Q4, year 2) ▪ EE Public Procurement Guidelines developed (Q2, Year 2) ▪ Training on EEPP with State Procurement Agency and Procurement Officers of national and local governments conducted ▪ Study tour on EEPP with State Procurement Agency and Procurement Officers of national and local governments conducted ▪ Awareness raising campaign on EEPP finalised ▪ Report on EEPP application in target regions (Q4, Year 3)
Activity 3.1: Development and introduction of municipal-level tools, practices, plans and capacities for participatory SFM and conservation	This activity prepares the framework conditions and introduction of municipal sustainable forest management in the country. The project will develop and introduce tools, practices, plans and economic planning instruments specifically designed for utilisation	To be defined	To be defined

	in municipal forest management and conservation efforts. In addition, capacity development for municipal authorities will enable staff and community members to utilize the developed instruments and to participate in management and conservation activities.		
Activity 3.2: Development, testing and promotion of local mechanisms to better protect interests of adversely affected stakeholders	This activity will activate the new participation approach, acknowledging the need for conflict resolution mechanisms. To do so, the project will develop, promote and test interest protection mechanisms.	To be defined	To be defined
Activity 3.3: Development of professional skills on SFM and conservation through vocational education and international partnerships with centers of excellence	This activity will support the professional skill development on sustainable forest management and conservation of local foresters and other forest workers. The project will work with vocational training colleges to strengthen the educational capacities of the institutions, to foster intake of local community members and to promote the forester job profile in the three target regions. Eventually, Georgian forests face a number of forest pests and diseases which require efficient responses. International partnerships with qualified centers of knowledge would allow to acquire efficiently necessary expertise and solutions. The project will seek international partnerships with centres of knowledge.	To be defined	To be defined
Activity 3.4:	This Activity creates alternative livelihood opportunities for individuals and households in	To be defined	To be defined

Introduction of selected value chains (timber, NTFP, eco-tourism)	the target regions to support the transition from informal fuelwood-related income sources to other (more formal) sources of income and thereby increasing household incomes, which eventually supports potential fuel switch and purchase of legal, high quality fuelwood. The project facilitates the establishment of timber-, NTFP-, and eco-tourism value chains via technical assistance.		
---	---	--	--

6.7 Project budget and source of finance

C. FINANCING INFORMATION							
C.1. Total financing							
(a) Requested GCF funding (i + ii + iii + iv + v + vi + vii)		Total amount		Currency			
		32.79		million euro (€)			
GCF financial instrument		Amount	Tenor	Grace period	Pricing		
(i)	Senior loans	Enter amount	Enter years	Enter years	Enter %		
(ii)	Subordinated loans	Enter amount	Enter years	Enter years	Enter %		
(iii)	Equity	Enter amount	Enter years		Enter % equity re- turn		
(iv)	Guarantees	Enter amount					
(v)	Reimbursable grants	Enter amount					
(vi)	Grants	32.79 million euro (€)					
(vii)	Result-based payments	Enter amount					
(b) Co-financing information		Total amount		Currency			
		144.90		million euro (€)			
Name of institution		Financial in- strument	Amount	Currency	Tenor & grace	Pricing	Seniority
Government of Georgia (GoG)		Grant	118.06 ⁵²⁸	million euro (€)	Enter years Enter years	Enter%	Options
BMZ		<u>Grant</u>	10.00	million euro (€)	Enter years Enter years	Enter%	Options
SIDA		<u>Grant</u>	2.25	million euro (€)	Enter years Enter years	Enter%	Options
Crystal		<u>Subordi- nated Loans</u>	10.50	million euro (€)	Enter years Enter years	Enter%	Options
SDC		<u>Grant</u>	Ca. 4.09	million euro (€)	Enter years Enter years	Enter%	Options
(c) Total financing (c) = (a)+(b)		Amount		Currency			
		177.69		million euro (€)			
(d) Other financing arrange- ments and contributions (max 0.5 page)		n/a					

⁵²⁸ Including EUR 84.7 million revenues of NFA to be reinvested in project activities.

C.2. Financing by component

Component	Activity	Indicative cost million euro (€)	GCF financing		Co-financing		
			Amount million euro (€)	Financial Instrument	Amount million euro (€)	Financial Instrument	Name of Institutions
Component 1: Sustainable Forest Management (SFM)	Activity 1.1. Development and implementation of SFM management plans	107.14	14.21	Grants	92.93	Grants	GoG, BMZ
	Activity 1.2. Strengthening of forest supervision	5.57	1.34	Grants	4.23	Grants	GoG, BMZ
	Activity 1.3. Provision of sustainably produced fuelwood by NFA	16.92	3.55	Grants	13.37	Grants	GoG, BMZ
	Activity 1.4. Enhancement of enabling environment for the nationwide implementation of ecosystem-based sustainable forest management (SFM)	3.86	1.38	Grants	2.48	Grants	GoG, BMZ
	Activity 1.5. Improvement of monitoring, and measurement, reporting and verification systems for the forest sector	5.43	1.57	Grants	3.86	Grants	GoG, BMZ
Component 2: Market Development for Energy Efficiency (EE) and Alternative Fuels (AF)	Activity 2.1. Establishing Technical Assistance and Investment Support Facility for EE-AF supply chain development	6.80	1.75	Grants	5.05	Grants	GoG, BMZ, SIDA
	Activity 2.2. Implementing consumer financing instruments for EE-AF solutions	15.70	4.33	Grants	11.37	Grants & Subordinated Loans	BMZ, Crystal ⁵²⁹
	Activity 2.3. Creating consumer awareness	4.21	2.04	Grants	2.17	Grants	GoG, BMZ, SIDA

⁵²⁹ The scheme is open for all banks and microfinance institutions and it does not give any kind of exclusivity to Crystal.

	and provision of advisory services for fuel-wood users						
	Activity 2.4. Enabling policies and regulations	1.63	0.35	Grants	1.28	Grants	GoG, BMZ
Component 3: Livelihood opportunities and local self-governance in forest management	<p>Activity 3.1 Development and introduction of municipal-level tools, practices, plans and capacities for participatory SFM and conservation</p> <p>Activity 3.2: Development, testing and promotion of local mechanisms to better protect interests of adversely affected stakeholders</p> <p>Activity 3.3: Development of professional skills on SFM and conservation through vocational education and international expertise</p> <p>Activity 3.4: Introduction of selected value chains (timber, NTFP, eco-tourism)</p>	4.09	0		4.09	Grants	SDC
Project Monitoring (M+E)		0.48	0.48	Grants			
Project Management Cost (PMC)		5.26	1.19	Grants	4.07	Grants	GoG, BMZ
Contingencies		0.6	0.6	Grants			
Indicative total cost (EUR)⁵³⁰		177.69	32.79		144.90		

⁵³⁰ Please note: differences as a result of automatic rounding may occur!

7 PROJECT IMPLEMENTATION

7.1 Accredited Entity – Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)

Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ), with its headquarters in Germany, is the Accredited Entity (AE) in this project. GIZ with its management structure in Georgia will operate as an Executing Entity. For the avoidance of doubt, these two GIZ functions will be strictly separated and are accountable to different management structures within GIZ. As the AE, GIZ has the oversight responsibility for the overall project as defined in the Accreditation Master Agreement (AMA) between GCF and GIZ. As AE, GIZ administers the funds on behalf of GCF and provides oversight guidance and quality assurance for the Executing Entities. The GCF AE unit based at GIZ head office is responsible for:

- Oversight of the project during implementation and finalization:
 - Participating in the steering committee meetings
 - Maintaining adequate documentation and communication with the GCF
 - Establishing internal control routines
 - Ensuring continuous project risk assessment
- Financial management, in particular receiving GCF proceeds as well as disbursing, administering and processing the funds. This implies:
 - Ensuring the proper use of GCF proceeds
 - Assessing the integrity and capacity of the Executing Entities (see Chapter 7.2 below for a detailed description of the project's executing entities)
 - Setting up the subsidiary agreements
 - Monitoring the subsidiary agreements and the performance of Executing Entities
 - Ensuring Executing Entities' procurement activities comply with GIZ's policies and rules
 - Evaluating the project, including the commissioning of independent mid-term and final reviews

Furthermore, oversight and quality assurance are supported by specific departments in GIZ head office:

- *Finance Department*: Responsible for strategic and operational financial control, maintaining standards of financial management, financial control, accounting, elaboration of annual statements of accounts, among other responsibilities.
- *Procurement Department*: Responsible for procurement, contracting, setting up the financing agreements with the Executing Entities; and monitoring of tender processes through the procurement plan, among other responsibilities.
- *Compliance and Integrity Department*: Responsible for ensuring compliance with GIZ and government rules and regulations.

7.2 Executing Entities

The following five Executing Entities will implement the project:

- 1) National Forest Agency (NFA)
- 2) Department of Environmental Supervision (DES), representing the State of Georgia
- 3) Environmental Information and Education Centre (EIEC)
- 4) Agriculture Projects Management Agency (ARDA)
- 5) Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

7.2.1 National Forest Agency (NFA)

NFA is a Legal Entity of Public Law (LEPL) of the Ministry of Environmental Protection and Agriculture (MoEPA) of Georgia. NFA is responsible for managing 1.8 million hectares of forest in the country and is the sole entity responsible for forest management in these areas. Under the new forest code, NFA together with other forest management bodies will additionally be responsible for the provision of legally and sustainably sourced fuelwood in the country. NFA is experienced in working with international donors and development institutions, such as GIZ, EU, WB, ADA, US Forest Service, and other international institutions. For details of NFA involvement in international projects see chapter on donor projects in the forest sector. Within the logframe of the project, NFA is in charge of the following sub-activities

Table 70: Activities under NFA oversight within the project

Activity	Sub-activity
Activity 1.1. Development and implementation of SFM management plans	1.1.1 Development of SFM management plans based on the principles of SFM in selected forest districts
	1.1.2 Implementation of SFM management plans in selected forest districts
Activity 1.3. Provision of sustainably produced fuelwood by NFA	1.3.1. Support to new mechanism for fuelwood provision to local population
	1.3.2. Establishment of business service yards (BSY)
Activity 1.4. Enhancement of enabling environment for the nationwide implementation of sustainable forest management (SFM)	1.4.5 Enabling improved integration of climate change adaptation in forest sector planning and management

NFA will receive EUR 14.87 million GCF grant funding for activities 1.1 and 1.3. GIZ AE will enter into a subsidiary agreement (grant agreement) with NFA. The contract will be legally binding and outline the detailed financial, procurement and implementation plan of the relevant elements of the project, incl. reporting and liability requirements, as well as ensuring compliance against GCF environmental, social and governance safeguards.

GCF funds will be used for:

- Procurement of equipment;
- Construction of forest roads and business service yards for wood sales;
- Procurement of services, such as forest inventories, harvesting, timber transport, forest management plan development and other services;

- International and national experts for developing training modules, and training of trainers; and
- Trainings.

7.2.2 Department of Environmental Supervision (DES) – representing the State of Georgia

DES is a State Sub-Agency of the Ministry of Environmental Protection and Agriculture (MoEPA) of Georgia. DES is responsible for the prevention and detection of illegal use of natural resources, the prevention and detection of environmental pollution, the control of natural resource license requirements and control of forest management based on Management-level C&I for Ecosystem-based Forest Management. All forest supervision activities and the management of procurement of equipment (e.g. vehicles) and other services are executed by DES. Within the logical framework of the project, DES is in charge of the following activities:

Table 71: Activities under DES oversight within the project

Activity	Sub-activity
Activity 1.2. Strengthening of forest supervision	1.2.1. Strengthening of procedures, standards, systems for enhanced law enforcement
	1.2.2. Implementation of improved forest supervision measures and technologies

DES will receive GCF funds of up to EUR 0.69 million. GIZ AE will enter into a subsidiary agreement (grant agreement) with DES – representing the State of Georgia. The contract will be legally binding and outline the detailed financial, procurement and implementation plan of the relevant elements of the project, incl. reporting and liability requirements and ensuring compliance against GCF environmental, social and governance safeguards.

GCF funds will be used for:

- Procurement of services to harmonize new standards and systems for the forest patrolling division with the standards and procedures for the already existing environmental patrolling division
- Development of training modules and implementation of trainings
- Investments in improved technologies, equipment and vehicles for forest supervision

7.2.3 Environmental Information and Education Centre (EIEC)

EIEC is an independently administered legal entity of public law (LEPL) of MoEPA. EIEC provides access to environmental education and ensures access to comprehensive information on the environment in Georgia. The center acts as a mediator between the environmental protection policy developing and implementing parties and ensure that strategies, legislation and policies are explained to the target groups in a simple language and format. Within the logical framework of the project, EIEC is in charge of the following activities:

Table 72: Activities under EIEC oversight within the project

Activity	Sub-activity
Activity 1.4. Enhancement of enabling environment for the nationwide implementation of sustainable forest management (SFM)	1.4.3. Development of knowledge management and training platform
Activity 1.5. Improvement of monitoring, and measurement, reporting and verification systems for the forest sector	1.5.1. Strengthening of the national forest MRV architecture (FIMS)
Activity 2.3. Creating consumer awareness and provision of advisory services for fuelwood users	2.3.3 National advocacy and awareness raising

EIEC will receive EUR 0.48 million GCF grant funding. GIZ AE GIZ will enter into a subsidiary agreement (grant agreement) with EIEC. The contract will be legally binding and outline the detailed financial, procurement and implementation plan of the relevant elements of the project, incl. reporting and liability requirements. In addition, GIZ Georgia enters into a grant agreement of EUR 0.41 million BMZ funding for FIMS.

GCF funds will be used for:

- Procurement of services for the development of online knowledge management and training platform (KMTP) for the forest sector
- Design and implementation of a national awareness campaign.

7.2.4 Agricultural Rural Development Agency (ARDA)

ARDA was established in 2012 as a non-entrepreneurial (non-commercial) Legal Entity “Agricultural Projects Management Agency” (APMA) by the Ministry of Agriculture of Georgia in order to promote rural development. From July 1, 2019 the official title was changed into Agricultural and Rural Development Agency (ARDA). The Agency is functioning under the supervision of First Deputy Minister of Environmental Protection and Agriculture of Georgia. The agency implements a variety of projects initiated by MoEPA. Furthermore, it is responsible for managing subordinate agricultural companies. ARDA has a track record of delivering state and donor-funded TA and Investment Support Facilities in the agricultural and rural sector (e.g. DANIDA, IFAD and GEF).⁵³¹ Within the logical framework of the project, ARDA is in charge of the following activities:

Table 73: Activities under ARDA oversight within the project

Activity	Sub-activity
Activity 2.1. Establishing Technical Assistance and Investment Support Facility for EE-AF supply chain development	2.1.1 Establishing the TAISF, including investment support to EE-AF producers and private sector companies
Activity 2.2. Implementing consumer financing instruments for EE-AF solutions	2.2.1. Design, implementation and marketing of the voucher program for EE-AF solutions for households

⁵³¹ See Chapter 2 for more detailed information on ARDA.

ARDA will receive EUR 5.00 million GCF grant funding. GIZ AE GIZ will enter into a subsidiary agreement (grant agreement) with ARDA. The contract will be legally binding and outline the detailed financial, procurement and implementation plan of the relevant elements of the project, incl. reporting and liability requirements. The GCF funds will be used for:

- Procurement for services for the Technical Assistance and Investment Support Facility, TAISF (consultants, printing, workshops, trainings)
- Design and implementation of the household subsidy scheme (voucher programme)

7.2.5 Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

GIZ is one of the largest international providers of capacity development and technical assistance on climate change worldwide. GIZ is currently carrying out over 300 climate-related projects, with combined funding of over USD 1.9 billion. Mitigation and adaptation account for equal shares in the GIZ portfolio, supplemented by activities on climate financing. A significant part of GIZ's work is implemented in least developed countries.

GIZ has been working in Georgia since 1992. GIZ's country office in Tbilisi primarily manages regional programs that are being implemented in Georgia and the two neighboring countries Armenia and Azerbaijan. Currently around 90 national and 25 international employees are working in the country.

GIZ leads and provides overall management of the capacity development and technical assistance (TA) to the project at national and subnational levels in various activities. Within the logical framework of the project, GIZ is in charge for the following specific activities:

Table 74: Activities under GIZ oversight within the project

Activity	Sub-activity
Activity 1.4. Enhancement of enabling environment for the nationwide implementation of sustainable forest management (SFM)	1.4.1. Strengthening of the legal framework for SFM
	1.4.2. Improvement of sector steering and coordination between adjoining sectors
	1.4.4 Improvement of vocational education and training for the forest sector
Activity 2.1. Establishing Technical Assistance and Investment Support Facility for EE-AF supply chain development	2.1.2 Feasibility assessment and pipeline development for new EE-AF solutions
Activity 2.2. Implementing consumer financing instruments for EE-AF solutions	2.2.3. Supporting MFIs and partner banks to structure and promote consumer financing products for EE-AF solutions
Activity 2.3. Creating consumer awareness and provision of advisory services for fuelwood users	2.3.1. Community-mobilization, advocacy and advisory services on EE-AF to fuelwood users
Activity 2.4. Enabling policies and regulations	2.4.1. Capacity building for introduction and enforcement of energy efficiency and environmental standards and labelling for EE-AF solutions
	2.4.2 Facilitating introduction of EE procurement practices in public sector

GIZ's additional responsibilities include:

- Managing the project budget of GIZ as Executing Entity that is spend in the country.
- Liaising with the GIZ Country Office regarding budget and finances, monitoring and reporting, staff and appraiser contracts.
- Reporting to the German Embassy and BMZ regarding their financial contributions to the project as well the overall progress of project implementation.
- Coordinating project implementation with the co-financing development partners and their projects and counterparts as well as other bi- and multilateral institutions operating in the same technical and/or geographical area.
- Liaising with, and reporting to, the Project Steering Committee.
- Coordinating with and reporting to the other four Executing Entities involved in the project (NFA, DES, ARDA, EIEC).
- Representing the project in national working groups and stakeholder forums.

GIZ as an Executing Entity will be responsible for a GCF budget of EUR 11.75 million, which will be devoted to staff and travel costs, equipment, international and local consultants, execution of trainings, workshops and conferences as well as professional/contractual services.

7.3 Other partners of the project

Project Partners (providing co-financing to the project): Apart from the Executing Entities, GIZ will work closely with a number of governmental, development and private sector partners for the implementation of the Funded Activity, including:

- The **Government of Georgia (GoG)** represented by the Ministry of Environmental Protection and Agriculture (MoEPA) and the Ministry of Economy and Sustainable Development (MESD) will provide in-kind co-financing to the project in form of expert staff, project implementation unit staff, and office space.
- The **Public Procurement Agency (PPA)** is a governmental procurement institution that establishes policies for the regulation of state procurement processes and provides oversight to all government procurement procedures. PPA will provide in-kind co-financing to the project in form of expert staff as well as training facilities.
- The **Swedish International Development Cooperation Agency (SIDA)** is a Swedish government agency and contributes indirect co-financing to the project's logical framework. SIDA provides technical assistance for the strategic and operational development of ARDA's portfolio in green rural development. Furthermore, SIDA will be involved in community-mobilization, advocacy and advisory services on energy efficiency and alternative fuels in form of a grant contribution to selected institutions. SIDA will provide co-finance of Swedish Krona 23.70 million (EUR 2.25 million) to the project in the form of a grant contribution to ARDA and a grant contribution to a national institution for the community-mobilization.
- The **Swedish International Development Cooperation Agency (SIDA)** is a Swedish government agency and contributes indirect co-financing to the project's logframe. SIDA provides technical assistance for the strategic and operational development of ARDA's portfolio in green rural development. Furthermore, SIDA will be involved in community mobilisation,

advocacy and advisory services on energy efficiency and alternative fuels in form of a grant contribution to selected institutions. SIDA will provide co-finance of Swedish Krona 23.70 million (EUR 2.25 million) to the project in the form of a grant contribution to ARDA and a grant contribution to a national institution for the community mobilisation.

- The **Swiss Agency for Development and Cooperation (SDC)** is a Swiss government agency, which will provide co-financing of CHF 4.7 million (EUR 4.09 million) to the project in the form of a grant contribution to GIZ. SDC will finance a livelihood community component (Component 3). Its goal will be to provide alternative livelihood opportunities and self-governance in forest management for rural communities.
- **Crystal** (and potentially other MFIs or banks, such as TBC, Bank of Georgia, Procredit Bank, etc.): Crystal will provide indirect co-financing of EUR 10.50 million to the project's logframe in the form of consumer loans for households on energy efficiency and alternative fuels. Based on the technical assistance of Sub-Activity 2.2.2 and 2.2.3, other MFIs and banks might develop further additional loan products in case the market development provide sufficient business opportunities. This may lead to further private sector leveraged finance (parallel financing).

7.4 Contractual arrangements

The graph below illustrates the contractual arrangements foreseen between the main partners of the project. The German Federal Ministry for Cooperation and Development (BMZ) will be commissioning GIZ with the implementation of the project (commissioning agreement). The GCF will transfer funds based on a Funded Activity Agreement (FAA) to the Accredited Entity GIZ. The Swiss Agency for Development and Cooperation (SDC) will sign a co-financing agreement with GIZ for the implementation of Component 3. This co-financing agreement will be established prior to the 2nd disbursement of GCF proceeds according to the FAA.

The Executing Entities – the National Forestry Agency (NFA), the Agricultural and Rural Development Agency (ARDA), the Department of Environmental Supervision (DES, representing the State of Georgia) and the Environmental Education and Information Center (EIEC) - will sign subsidiary agreements with GIZ, based on GIZ standard operating procedures for grant agreements. These subsidiary agreements establish the legal basis on which GIZ makes the GCF Proceeds available to the Executing Entities for the measures to be implemented by the Executing Entities, in accordance with the AMA and FAA.

Furthermore, GIZ will sign co-operation agreements with SIDA, Crystal, in which their co-financing contributions as well as reporting responsibilities will be specified. GIZ will also sign a cooperation agreement with the Public Procurement Agency (PPA), covering its in-kind contribution to the project.

Finally, GIZ will conclude an implementation agreement with the Government of Georgia (represented by MoEPA and MESD), which will specify their in-kind contributions to the project. For the avoidance of doubt, PPA and the Government of Georgia, represented by MoEPA and MESD will not receive GCF proceeds but provide co-financing to the project.



The graph below shows the overall fund flow of ODA funding and private sector funding in the project (government contributions are excluded). Direct co-finance will flow from BMZ, SDC and GCF to GIZ head office (AE). SIDA and (Micro)-finance institution provide indirect co-finance. GIZ (AE) will transfer GCF funds to the five Executing Entities. The Executing Entities NFA, EIEC and DES (representing the State of Georgia) will all use the funds within the context of Component 1 Sustainable Forest Management. The funds to ARDA will flow into Component 2 Energy Efficiency and Alternative Fuels. ARDA transfers the GCF financed funding of the household subsidy scheme for EE stoves via a voucher programme to the consumers. Banks and Microfinance Institutions (Crystal, TBC, Bank of Georgia, Procredit Bank, etc.) provide EE-AF financing to consumers via a consumer loan. SIDA provides funding to ARDA for technical assistance and transfers funding to a national institution (to be identified) to implement community-mobilisation with consumers as final beneficiaries. The Georgian government allocates significant additional budget for the two project components. These funds, however, are not part of the diagram.

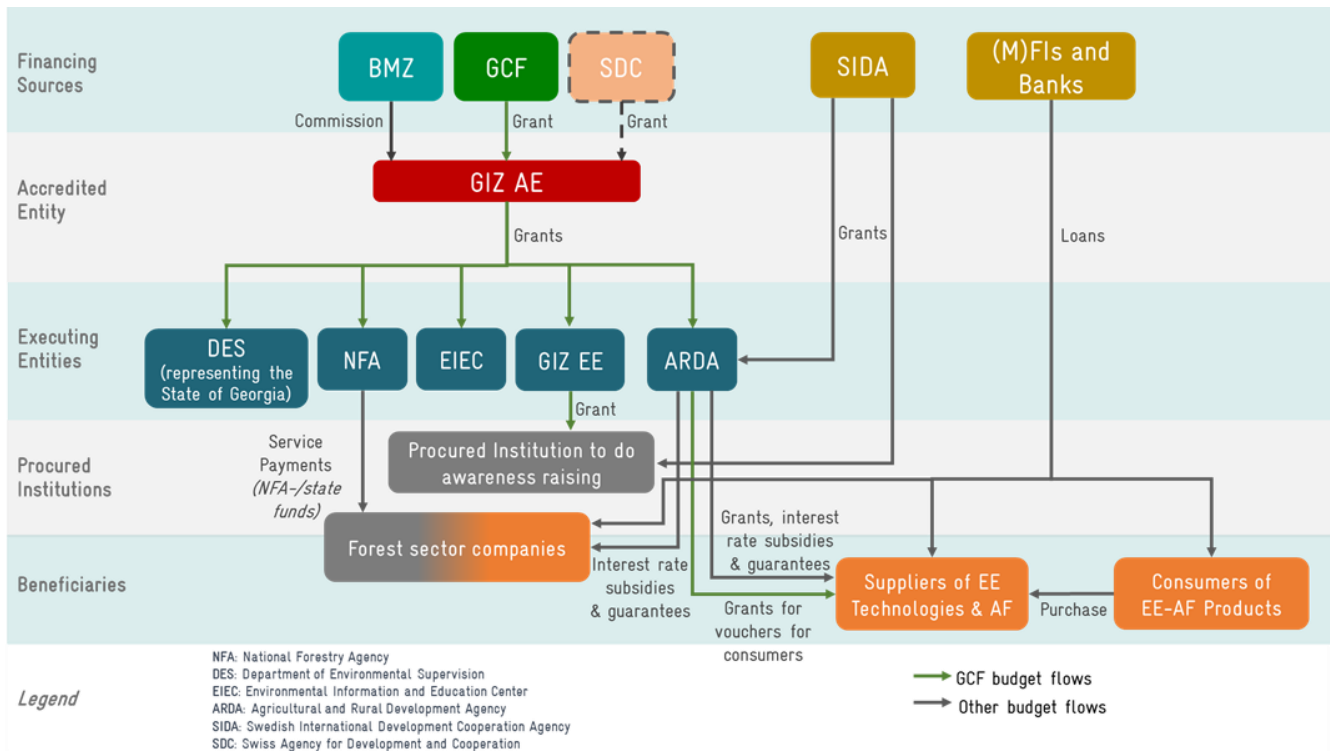


Figure 89: Flow of funds

7.6 Financial management

The financial management of the project will follow GIZ's internal rules and regulations. GIZ has bank accounts with Deutsche Bundesbank and Commerzbank. GIZ will not open a specific bank account for GCF proceeds and other GCF funds but will ensure that all funds provided are clearly identifiable from GIZ's other funds by setting up separate cost units exclusively for the funds disbursed by the GCF for each funded activity (ledger accounts). Funds received and expenditures incurred will be booked to the respective cost unit according to generally accepted accounting principles and procedures accepted by the German government. As a general principle, GIZ disburses funds to the recipients in accordance with the progress of the project. The Executing Entities will have to prove the proper use of funds and the defined progress as a prerequisite for any further disbursement. Independent external auditors will perform annual financial audits of the project in line with International Auditing Standards.

7.7 Procurement

In case of procurement by GIZ, GIZ will follow its own procurement guidelines. GIZ is required to comply with the relevant contracting rules as established in the German Act against Restraints of Competition (GWB), the German Regulation on the Award of Public Contracts (VgV) and, if applicable, the Contracting Rules for the Award of Public Service Contracts (VOB and UVgO) when procuring services, construction work, and supplies.

When awarding contracts for supplies and services (including consultancy services) to be financed in full or in part from the grant agreement, the external Executing Entities will observe

their own national regulation for public procurement and will in any case comply with the provisions mentioned in the Procurement Guidelines for projects funded by GCF/GIZ.

The Procurement Guidelines shall not contradict the applicable national procurement law and/or regulations for public procurement, which apply in the Executing Entities country. In principle, the regulations of the Executing Entities country are to be observed; the procurement procedures mentioned in the Guidelines are obligatory minimum standards. While implementing a project with public funds the Executing Entities should take reasonable account of economic efficiency as well as ecological and social aspects.

7.8 Governance Structure

The following Figure 90 provides an overview of the project's governance and implementation structure.

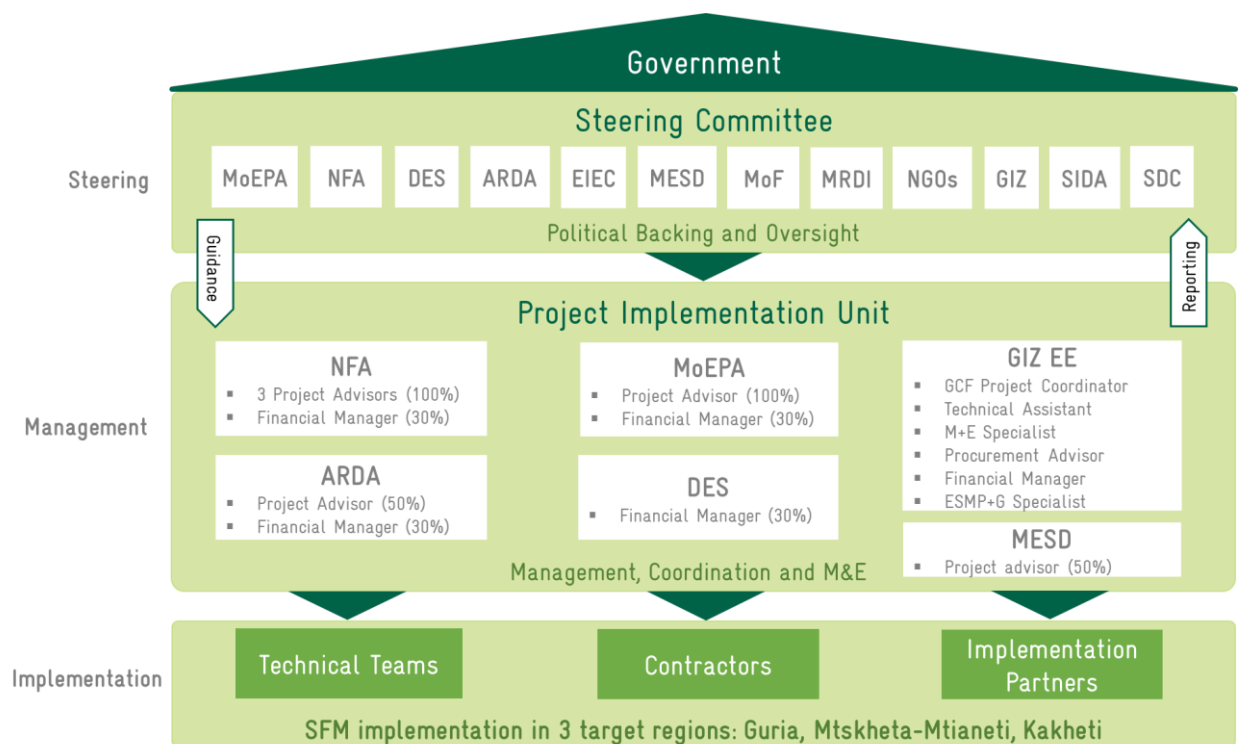


Figure 90: Governance and implementation structure

7.8.1 Steering Committee:

The project will establish a Steering Committee as the main governing body for the project, as shown in the Figure below. The Committee will meet two times a year and members will consist of department heads/directors from MoEPA, NFA, DES, ARDA, MESD, MoF, EIEC, MRDI, NGOs, SIDA, SDC and GIZ. The mandate of the Steering Committee includes:

- Providing overall guidance for the project.
- Providing feedback and validation of annual work plans, annual reports and audits.
- Ensuring project energy and coherence with the evolution of the international and national context.

- Being informed of project adherence with E&S Safeguards and Gender Action plan objectives.
- Supporting the coordination of project activities across different line ministries and between private and public sector and civil society.

7.8.2 Project Implementation Unit

A The Project Implementation Unit (PIU) with representatives of project partners will be set up for the duration of the project. The mandate of the unit includes:

- Enhance common understanding among Executing Entities on the theory of change and how transformation in both sectors shall evolve.
- Discuss, monitor, and promote best possible synchronization of implementation between the Executing Entities.
- Define, monitor and coordinate work plans.
- Ensure that budgets and work plans are on track and monitor project progress.
- Identify and resolve bottlenecks and implementation challenges relevant on target region level.
- Monitor adherence to environmental, social and fiduciary safeguards; monitor implementation of the Project's Environmental and Social Management Plan (ESMP) and Gender Action Plan (GAP), and steer review of these plans if needed.
- Identify issues required to be brought to the attention of the steering committee and/or political decision makers.
- Provide for information exchange and synergies between project outputs.
- Agree on terms of reference, recruitment of experts.
- Discuss outcome and impact monitoring processes and results.
- Prepare monitoring reports.

7.9 Arrangements for Monitoring and Reporting

Monitoring, reporting and evaluation arrangements will comply with the relevant GCF policies, as stipulated in the AMA, FAA and project-related Financing Agreements and Implementation Agreements with Executing Entities and Implementation Partners, which Executing Entities will extend to sub-grantees. The project will apply a customized results-based Monitoring and Evaluation (M&E) system. The system will be based on:

- GIZ Standard Operating Procedures ("GIZ's evaluation policy - Principles, guidelines and requirements")
- The project logical framework
- The project implementation schedule
- Requirements of the GCF's Annual Performance Report
- Development partners' Standard Operating Procedures

- Procedures and requirements of project partners and stakeholders in Georgia

The M&E system will track project inputs, actions, activities, outputs, and impacts as well as associated financial flows across all outputs in all project districts and at national level in Georgia. The overall responsibility and oversight for M&E and reporting lies with the GCF AE unit of GIZ head office. The national Project Management Unit (PMU) in Georgia will implement the M&E system and work closely with Executing Entities, Government project partners and development partners.

7.9.1 Recruitment of M&E staff

Immediately when the project commences, GIZ's GCF AE unit at head office in Germany will make available one expert to oversee, coordinate and manage the project M&E and reporting routines. He/she will cooperate closely with the PIU and GIZ Executing Entity staff to coordinate the implementation of the project's M&E system. As soon as GCF proceeds become available in Georgia, the PIU will recruit one full-time M&E specialist. The PIU will additionally hire an international consultant/consulting company to design and to support the management of the M&E system and provide on-the-job training for PIU and other stakeholders of the system where requested.

7.9.2 Independent monitoring and evaluation studies

Interim evaluation

GIZ's AE unit will initiate an Interim Evaluation in year four of the project (or at any time that GIZ, the NDA and/or the Project Steering Committee consider necessary). GIZ will competitively select and assign an independent consultant for this task. The Interim Evaluation will duly involve project stakeholders, including target groups and beneficiaries, project partners and contributing development partners. The Interim Evaluation will include:

- A review of the institutional, administrative, organizational, environmental, social, economic, technical and financial aspects of the project based on the assumptions and risks included in the design (among others as specified in the Funding Proposal and Feasibility Study) and M&E system;
- A review of covenants to assess whether they are still relevant or need to be changed or waived due to altered conditions;
- A review of the viability of remaining planned impacts;
- An assessment of the need to restructure or reformulate the project and the effects of such restructuring on the project's objective and long-term goals.

GIZ's AE unit will make available the MTR report to the GCF Secretariat and project stakeholders.

Final evaluation

In due time before the completion of the project, GIZ's AE unit will initiate a project completion mission, in which the implementation of the project based on the project-, financing- and implementation agreements, the delivery of outputs and the achievement of project targets will be evaluated. The mission will duly involve project stakeholders including target groups and

beneficiaries, project partners and contributing development partners. At the time of the project's physical completion and commissioning, and before the expiry of the guarantee period, GIZ's AE unit will make available a final report to the GCF Secretariat and project stakeholders.

Data collection and frequency

The PIU will coordinate data collection for implemented activities (indicators, implementation challenges and financial status) through responsible executing departments / divisions at the national and regional level on a regular base. The PIU will supervise and guide the monitoring and evaluation.

7.10 Licenses, permits and other regulatory requirements

Depending on the location of the Business Service Yards (BSY) of NFA, construction permits might have to be obtained. These permits will be obtained by NFA before disbursement of GCF proceeds for this specific activity. Other than that, GIZ is not aware of project requiring specific approvals, permits, licenses or land to allow for the implementation of planned activities.

7.11 Knowledge management

Aims of knowledge management in the project's context

Knowledge management in the context of the project has the following aims:

- Strengthen dissemination of information and knowledge to local communities on diverse topics related to the forest sector reform, climate change, SFM, and EE/AF. The project represents an important step forward to improve the engagement of local people in sustainable forest management, and aims to improve their capacities on SFM, as well as opportunities for rural livelihoods based on sustainable activities. The Information and knowledge dissemination framework on SFM will also cover private sector contractors, academia and international organizations among others.
- Improve the dissemination of information and knowledge within and among key stakeholder groups. This includes building on networks, and improving coordination and engagement through multi-stakeholder platforms.
- Develop the capacities of Government staff in key institutions (MoEPA, NFA, DES, EIEC) on SFM to ensure that key knowledge is fully integrated and retained in institutions, and shared within and across sectors. This includes improving knowledge management and training within forest sector institutions, and also improving coordination and communication across other related sectors (e.g. on topics related to energy efficiency and alternative fuels, rural development, among others).
- Develop the capacities of supporting organizations, including local CSOs, to support the implementation of awareness raising campaigns and actively engage local communities on forest and energy sector reforms.
- Develop platforms, modules and tools to improve knowledge management and dissemination and to ensure long-term availability of developed knowledge products and trainings. This includes the development of a knowledge management and training platform for the

forestry sector, institutionalizing trainings, supporting FIMS module development, among others, to strengthen the collection and analysis of data/ information, and the management and dissemination of knowledge and information.

- Improve knowledge of rural households about energy efficient appliances/technologies and alternative fuels, their benefits and practical applications.
- Develop capacities of EE-AF supply chain stakeholders to identify and prepare bankable investment projects, conduct product marketing, build distribution and logistics for new EE-AF products.
- Strengthen capacities of the governmental agencies (MoESD, Public Procurement Agency, and new EE Agency) for implementation of EU Ecodesign and EE Directives.

Knowledge required by the project

Knowledge management is a core element of the project, considered across all Outputs and Activities. Knowledge is required on diverse topics, including:

- SFM: best practices and approaches for planning, implementation and monitoring.
- Climate change and its impacts on forest ecosystems in Georgia
- Marketing and business plan development for the forest and EE-AF sector
- Best practices for forest supervision, including patrolling and inspection and the use of technology and equipment for improved monitoring, inspection and enforcement.
- Software development, and knowledge on forest sector information and monitoring systems.
- Vocational education and training, with a focus on the forest sector and SFM.
- Energy efficient technologies and practices for households
- Production of USBP: assessment of raw materials availability, manufacturing technologies, distribution and logistics
- EE and environmental standards and regulations for household appliances
- International best practices on EE public procurement
- Design of consumer financing schemes for energy efficient appliances and other EE packages for households.

Knowledge products created/ supported by the project

The project builds on substantial work conducted by GIZ and other donors in the forest sector, as highlighted in Chapter 5.4, which has generated a strong knowledge base. The project builds on the experiences of this work, and has integrated their lessons learned and recommendations into the project design. It further builds on international best practices for SFM, in particular those practices which are suitable for the Georgian context, since the country's mountainous terrain provides unique challenges and opportunities.

New knowledge will be managed in a way that it is accessible, stored appropriately, and disseminated through suitable channels. As described in Chapter 10, regular stakeholder engagement is envisioned throughout project implementation. Cooperation with diverse stakeholders including national and local CSOs, municipalities, community liaison representatives, private sector

actors, academia, among others will be further a cross-cutting element throughout project implementation.

The following are some of the main knowledge products created/ supported by the project:

- Development and management of a project website.
- Development of a forest sector knowledge management and training platform to strengthen knowledge management, dissemination and training.
- SFM guidelines, manuals (incl. hard copies, soft copies, and other supporting material including e-courses, and videos), and other informative materials on SFM (brochures, posters, etc.)
- Training modules and materials integrated into the proposed training platform, and materials for training trainers.
- Forest management inventories that inform FMPs in the target districts. Business plans will also be developed for NFA in all 8 districts.
- SOPs, manuals and procedures for SFM and regulatory changes for NFA and DES staff.
- Workshop summaries from annual NFP plenary meetings, and annual plans for working groups.
- Secondary legal act/ regulation on the commercial use of non-timber forest resources.
- Assessment reports on climate risks and potential adaptation strategies for forested ecosystems in the 3 project regions.
- FIMS software modules, to support ongoing forest information data collection and monitoring.
- Documentation of successful experiences and lessons learned from implementation of SFM, and promotion of energy efficient technologies and alternative fuels in the target districts.
- Vocational education courses to support the education of forest workers and foresters, under the new forest code requirements.
- Package of PR and promotional materials for households on EE-AF products and financing option.

Consideration of different beneficiaries/ audiences in the design and dissemination of knowledge products

The project has been designed taking into account the different needs of project beneficiaries, including considering what knowledge products are needed for what beneficiaries/ audiences. Publications and reports will be drafted with a specific audience in mind, ensuring that information and language is presented in an appropriate way. For instance, for communication with the local population on topics related to SFM, it is important that technical elements are clearly explained for those who may not have an in-depth knowledge of the forest sector.

In order to ensure the widest dissemination and disclosure of project information, including any details related to applicable environmental and social safeguards, local and accessible disclosure tools including audiovisual materials such as flyers, brochures, and videos will be utilized in addition to other communication modes. Particular attention will be paid to women, people with

hearing or visual disabilities, people with limited or no access to internet, and other groups with special needs.

Outreach, extension/technical support at the community-level, workshops and capacity building activities will be socially inclusive, promoting the engagement and participation of both men and women. It will take into account the timing of meetings, discussing with local community representatives on suitable dates/ times. Project staff and trainers will include male and female representatives. They will all receive training on gender equality and social inclusion within the context of the project.

Knowledge mainstreaming and sustainability during project implementation

To support processes that generate, process and disseminate such knowledge to various stakeholders, a comprehensive communication plan and regular exchange of information will be supported through the project (Activity 2.3). Such practices will ensure that key government institutions at the national, regional and district levels, as well as CSOs, banks, private sector actors, local communities, among others understand the importance of the forest sector reform and SFM, as well as energy efficient technologies and alternative fuels. Close coordination will be sought with EIEC, who has a mandate to support knowledge dissemination related to environmental issues. EIEC plays a similar role in the UNDP GCF project in Georgia, and thus, the proposed project will build on capacity building efforts conducted by UNDP and GCF in the country. The project's knowledge management approach aims to link to existing complementary information channels. It supports the 'upgrading' of the NFP process, involving a multi-stakeholder platform where NGOs, academia, private sector and diverse public sector institutions come together to discuss key topics related to forest sector reforms. Such a platform remains an important channel for the dissemination of information related to the sector reform, but also for project information, in particular related to experiences and lessons learned during project implementation.

Local CSOs, community liaisons and municipalities will all play an important role in awareness raising campaigns for forest sector reforms, and the dissemination of project information. Community liaisons already exist in many communities, and serve as key focal points between municipalities and local communities. The project expects to engage these liaisons, municipalities and CSOs to support with awareness raising for the project, and forest sector reforms – understanding the importance of these existing local channels that are based on trust and ongoing cooperation.

The project will also ensure regular communication with the Georgian NDA and UNFCCC focal point. It will ensure the provision of relevant information to inform the BUR, National Communication, and NDC reporting. The second NDC to the UNFCCC will cover the period from 2025-2030, and the project team will provide information to the NDA to inform such a process based on early results, experiences and lessons learned from the project. Communication and collaboration with national universities will be sought to provide the project with key lessons learned and relevant education material, as well as to support these universities in supporting research on SFM, EE and AF in the country. The NFP plenary meetings and working groups will further be used as a key platform for information dissemination, and coordination between diverse stakeholders, including academia.

Maintaining knowledge benefits beyond the project lifetime

The long-term sustainability of project interventions is enhanced by the project's focus on individual and institutional capacity building, both of the implementation entities and the key beneficiaries.

Measures focused on institutional strengthening at the national, regional and district levels form an essential element of the individual activities, given local capacities and the need for improved knowledge on sustainable forest management planning, implementation and monitoring. Government entities and private sector service providers will improve their knowledge and skills for sustainable forest management. Thus, government entities will likely continue to support such measures after project completion, and even scale up SFM to other districts, and regions in the country. The project further emphasizes the institutionalization of trainings, developing training modules that can be replicated, and training trainers within government institutions understanding that in the future substantial investments will be needed in staff for scaling up SFM. Training trainers approach will ensure that the gained knowledge and trainings on SFM will be retained in the forestry sector of Georgia and capacities will be available for institutionalization. Measures focused on improving vocational education and training will help to cover the training and formal education of forest workers to meet the new forest law (short- to medium-term), and ensure long-term high-quality education based on SFM is provided to forest workers across the country.

Ultimately knowledge products, tools and platforms developed by the project should be embedded in institutions to the greatest extent possible, enabling their continued uptake in the future. The knowledge management and training platform will store all knowledge products developed by the project.

8 PROJECT JUSTIFICATION AND SUSTAINABILITY

8.1 Justification for GCF funding

8.1.1 Funding gap

8.1.1.1 SFM (Component 1)

After years of forest degradation, Georgia is actively seeking to implement an ambitious forest sector reform to preserve the ecological value (including carbon stocks), enhance the economic value and increase the social value of its forests. In the past, Georgia has put a lot of efforts and has closely worked with bilateral and multilateral donors to design the new SFM concept, which is now ready for implementation. The degree and complexity of the necessary change in both sectors, forestry and rural energy, is high, as is the need for technical support and investments for the implementation of the reform.

Since independence, Georgia's forestry sector has suffered from declining budgets for forest management and protection, severely undermining its capacity to properly enforce forest laws and regulations. NFA is dependent on state budget as well as its own revenues to cover its costs. In 2018, NFA budget expenditures reached EUR 9.66 million (GEL 28.88 million). Around 60% of NFA's budget was from their own generated income (EUR 6.15 million or GEL 18.45 million), and 40% was from state budget (EUR 3.45 million or GEL 10.35 million). This demonstrates a notable change since 2015, where 67% of NFA's budget was from state funding. While NFA's total budget has increased in recent years, the financing needs are also expanding due to the increased necessity for investing in the forestry sector. In 2018, the level of expenditures was EUR 4.86/ha (GEL 14.48/ha), which is very low. In comparison, SFM implementation in many middle-income countries often requires investments in the range of EUR 250-270 per hectare.⁵³²

The budget is insufficient to cover the minimum basic forest management needs, as majority of it is dedicated to staff and administrative costs (60% of NFA's budget, of which 53% is from the state budget and 47% from NFA revenues). Forest use activities (cutting operations and harvesting) comprise an additional 30% of NFA's budget (20% is from state budget), which is deemed important as it is the potential principal revenue generating activity for NFA. Much needed forest maintenance and restoration activities comprise only 9% of NFA's budget (of which only 6% is from state budget). Forest inventory activities comprise less than 1% of the budget (entirely financed from NFA revenues). Such trends are similarly observed in the project regions (Guria, Kakheti and Mtskheta-Mtianeti)⁵³³ where NFA had a budget of EUR 2.1 million (GEL 6.3 million) for above mentioned activities in 2018 (an average of EUR 3.36/ha, below national average).

⁵³² Costs for SFM in a permanent (i.e. non-rotational) forest in China, based on an International Climate Initiative Project. It should be noted that costs for SFM can differ greatly based on the country and regional context (accessibility, labour regulations, currency, and inflation, among other factors), however forestry experts noted that SFM in many countries with a developed forestry sector would require investments within the range reported.

⁵³³ Comprising 15% of the NFA-managed forest area actually covered by forest.

Following the phased approach on implementation of the reform,⁵³⁴ the government aims to start implementation of SFM in the eight target districts. According to calculations, for the first 15 years⁵³⁵, revenues from SFM activities in the districts will not be sufficient to cover investment and operation and maintenance costs, because of the timing required for forest management measures and wood supply system to reach maturity and timber/fuelwood sales volumes to increase accordingly. In the 8 districts the government would have to inject a total of EUR 32.80 million (of which EUR 18 million (ca. 60%) are required in the first seven years) to make up for the revenue shortfall in years 1-15, more than EUR 2 million on average p.a. To put this in context, this would be equivalent to half the government's expected budget support to the whole NFA in 2019, but for a forest area that is just 15% of the total. It fully exceeds the annual budget of NFA in the three regions (that include 14 districts). Additional substantial investments are needed to build up the capacities of DES for forest supervision, in addition to other technical assistance needs in the sector (e.g. building up capacities on forest management in NFA and for private sector contractors, improving vocational education and trainings, strengthening the regulatory framework and ensuring its alignment with the New Forest Code and the Management-level Criteria and Indicators for ecosystem-based forest management, among other investments.⁵³⁶

As shown above, the need for additional financial and technical assistance to cover the costs of initiating and conducting SFM in Georgia is substantial. As regards technical assistance, several small scale technical assistance projects are supporting the forestry and rural energy sector. The cooperation potentials are already identified⁵³⁷. However, the scope of required TA support is well beyond existing donors' commitment and partnership agreement with Georgia. To address this TA shortfall, the project in addition to GCF funding, has mobilized substantial additional commitments from BMZ, SIDA and potentially other development partners.

In order to address funding shortfall at NFA to cover SFM-related investment needs, the following options can be considered:

- **Option 1 – increase in public financing:** The Government already committed to contribute some substantial additional resources to reduce the funding gap for SFM measures and wood supply in the 8 target districts, i.e. EUR 19.60 million (GEL 58.80 million) for year 1-15 (in average EUR 1.31 million/year or GEL 3.92 million/year). This is the maximum the Ministry of Finance is able to provide to the sector. In addition, budget support will continue on the remaining 85% of the forest area not targeted by the project, which in 2019 would equate to approx. EUR 3.4 million.⁵³⁸ In addition, the government makes available additional state budget contributions for DES to hire forest patrollers and to provide the basic equipment for forest supervision functions, as well as re-invest NFA's future revenues in SFM. Georgian Government is also increasing its commitment to provide investment support to EE-AF sector, beyond its current level of support to rural and agricultural SMEs.

⁵³⁴ For more detail, please refer to the Feasibility Study Chapter 5.2.3.4.

⁵³⁵ From year 16 onwards, the NFA will make profit from forest management measures and wood supply system, see next section for details.

⁵³⁶ For a more detailed assessment of the financial baseline, see Feasibility Study, Chapter 5.2.4.

⁵³⁷ See Chapter 5.4 of the Feasibility Study on cooperation potentials.

⁵³⁸ 85% of GEL 11.9 million (EUR 4 million), the state funding required for the NFA as a whole under the 2019 budget.

- **Option 2 – concessional loans:** Several activities for which GCF grant is requested will not directly result in revenue generation, but rather support the enabling environment for SFM planning and implementation. This includes investment in infrastructure to strengthen and enforce forest surveillance practices and prevent illegal logging via DES, none of this investment though is revenue-generating and therefore loan financing is not applicable. For revenue generating activities in SFM implementation and building up the NFA wood supply system, due to the prolonged period of negative cashflows, borrowing to cover the funding gap is not advisable, even at the concessional terms offered by GCF and development banks (grace periods typically do not exceed 5 years). In addition, the SFM represents a complete overhaul of Georgia's forest management system in the target districts. Information asymmetries deter commercial lenders from supporting the project, especially with the very long-dated loans that would be required due to the cashflow profile.

In addition, the two financing options described above are not advisable in light of Georgia's fiscal and debt situation (see Chapter 1.2.2). The government has committed to fiscal consolidation under an ongoing IMF program. Significant budget reforms were introduced in 2017 and no increase in current spending is envisaged in real terms in the coming 5-7 years. The budget deficit has been declining gradually since 2017/18 as envisaged by the IMF. The deficit is forecasted at 2.6% of GDP in 2019, has to be maintained under 3% in coming years and reduced gradually to 2.5% in the medium term starting from 2023. Maintaining the fiscal deficit within the above-mentioned limits is extremely important since this is the debt stabilizing level of fiscal deficit. Government debt is forecasted at 43.7% of GDP for 2019, which needs to be reduced gradually and maintained within 35%-40% of GDP in the medium term. Within this fiscal consolidation framework, the set limits of government debt and budget deficit allow only for increased spending in education and investments in infrastructure that maximizes the usage of Georgia's transit and tourism potential. At the same time, there are constraints on including new commitments in many other directions and no room for additional liabilities.

GCF funding is required to address, in the form of TA, extensive capacity building needs of the forest sector stakeholders, as well as financial gaps for investment in SFM by the Government. Currently, the Government with GIZ support is introducing forest management planning for 64,892 ha in Akhmeta, Kakheti, but available public resources are not sufficient to implement the FMP and reach the scale of NDC commitment. Under current framework, the value of forest is being depleted through unsustainable extraction of timber and fuelwood. The project seeks to address this market failure by supporting forest sector reform leading to scaling-up SFM approach and eventual increase in forest's economic, social and ecological values.

8.1.1.2 EE-AF Sector (Component 2)

In view of the barriers explained earlier in Chapters 5 and 6, EE-AF sector does not represent a viable investment opportunity neither for suppliers, nor for consumers. As regards EE-AF suppliers, lack of effective market demand limits their ability to invest in EE-AF product development and manufacturing capacity expansion. At the same time, EE-AF suppliers are not covered by the existing state-sponsored investment support mechanisms for private sector, such as guarantees, interest rate subsidy, and investment grants. The Government of Georgia recognizing the need to support nascent EE-AF sector will co-finance investment support activities under the

Project's Component 2. In addition, the Government of Georgia through the state-funded Georgian Partnership Fund (GPF) considers providing equity investment in the EE-AF sector development once there is a sufficient pipeline of bankable project to invest in. However, due to capacity constraints among EE-AF suppliers, such pipeline does not yet exist and there is a need for additional TA support. There is no on-going donor-supported project which would address, even partially, the TA needs in this sector.

On the consumer side, affordability of EE-AF products is the major barrier. Even for the least cost solutions, such as an EE stove, there is a funding gap. Households are restricted in their ability to obtain credit for the full cost of an EE stove due to their low revenue base, which determines maximum borrowing capacity as per Central Bank regulation and banks' credit requirements. Grant funding is required to address the gap. The Government of Georgia is already providing social subsidies to the most vulnerable households, however its ability to increase the level of spending under this budget category is restricted due to commitment to fiscal consolidation under an ongoing IMF program, as described earlier.

8.1.2 Choice of instruments and concessionality

Both, Components 1 and 2, will catalyze significant co-finance from the government, the private sector and project beneficiaries. GCF grants, by filling selected funding gaps while minimizing concessionality, will be crucial to the successful execution of the project.

8.1.2.1 SFM⁵³⁹ (Component 1)

The model for SFM implementation and wood supply under the NFA is meant to be financially sustainable in the long run, by generating revenues from timber and fuelwood sales that more than offset capex and operations and maintenance (O&M) costs. For the first 15 years, however, revenues will not be sufficient to cover capex and O&M, because of the timing required for SFM measures to reach maturity and timber/fuelwood sales volumes to increase accordingly. Without GCF support, the government would have to inject a total of EUR 32.8 million to make up for the revenue shortfall in years 1-15.

A EUR 13.2 million GCF grant for Activity 1.1 and 1.3 of the project will contribute to alleviating this shortfall. The government has committed to step in, out of budget sources, to fill the SFM's remaining funding gap of EUR 19.6 million in years 1-15 (EUR 1.3 million p.a. on average). This is a significant commitment that exceeds the current funding injected by the government to support the current forest management system, pro-rata in the target districts. In 2019, for instance, a budget support of GEL 11.9 million (~EUR 4 million) is expected for the NFA across the entire Georgia – the target districts represent 15% of the total NFA forest area.

Due to the prolonged period of negative cash flows, borrowing to cover the funding gap is not advisable, even at the concessional terms offered by GCF and development banks (grace periods typically do not exceed five years). In addition, the SFM approach represents a complete overhaul of Georgia's forest management system in the target districts. Information asymmetries

⁵³⁹ For details on the financial and economic model please see Annex 3 to the Funding Proposal.

deter commercial lenders from supporting the project, especially with the very long-dated loans that would be required due to cash flow profile described above.

Importantly, from year 16 onwards, the SFM will be consistently cashflow-positive, ensuring the long-term sustainability of the project without any additional concessional funding or budget support from the government. This long-term financial sustainability is indeed one of the reasons for the government to transition from the current system to the SFM.

Without concessionality, the expected financial IRR (FIRR) of Component 1 (SFM) is 2.4% over 20 years, the time period conventionally used to evaluate the effectiveness of SFM projects. This is well below Georgia's financial cost of capital of ~8.4%.⁵⁴⁰ The financial NPV, using such cost of capital as the discount rate, is negative EUR 9 million. A EUR 13.2 million GCF grant, covering approx. 25% of the SFM's capex over the first 7 years, would increase the FIRR to 9.7%. In order to minimize concessionality, the grant is sized so that the FIRR reaches just above the sovereign cost of capital and does not create a financial windfall for the government.

8.1.2.2 EE-AF Sector (Component 2)

The objective of GCF grants in Component 2 is to kick start two markets that are currently in their infancy in Georgia and bring them to a meaningful scale: EE stoves and AF. On paper, the replacement of a conventional stove with an EE one is an attractive financial proposition for a household, generating a financial IRR of 45% without GCF support (see Chapter 8.2 for details). In practice, several barriers hinder the widespread adoption of EE stoves, including: (i) the high price point of an EE stove, considering local income levels (GEL 1,000 EE stove price vs. GEL 50-70 for a conventional one); (ii) product novelty, with only few units sold currently in Georgia and lack of industry certifications of product quality; (iii) lack of sizable domestic production of EE stoves or imports (and for the latter, particularly high prices); and (iv) lack of an easy-to-tap financing product specifically targeted at the purchase of EE stoves, to help consumers bridge the price gap between an EE and a conventional stove.

GCF grants will be used to incentivize the purchase of EE stoves in the form of a subsidy covering 30% of the purchase price (GEL 300 / EUR 100 per unit) via a voucher scheme. The incentive scheme will be put in place in partnership with local financial institutions (banks and MFIs) that will offer loans covering the remaining 70% of the purchase price. Such loans will bear full commercial interest rates, which are currently in the 30% range for MFIs (no concessionality offered by the financial institutions). Households will have the option to apply for a consumer loan covering the EE stove purchase only, or the stove and the annual supply of AF. Financial institutions will bear the risk of loan default (no government or other guarantees are attached to the EE stove loan programme). Similar consumer financing schemes, such as the EBRD's Sustainable Energy Financing Facility (SEFF), proved instrumental in stimulating demand of other household products, such as EE appliances.

Through the financial incentive scheme, the project will stimulate demand for up to 30,000 EE stoves and related AF supply, creating a market opportunity for entrepreneurs that wish to start EE-AF production businesses. GCF grants will not be used to provide financial support to such

⁵⁴⁰ Yield on Georgia's 10-year (longest-dated) sovereign bonds as of mid-June 2019.

entrepreneurs, to minimize concessionality and market distortions. GCF support will be limited to funding technical assistance (via the Technical Assistance and Investment Support Facility, TAISF, based at the Agricultural and Rural Development Agency, ARDA), together with BMZ's co-finance.

Financial support to entrepreneurs will be supplied by ARDA under its existing support schemes, which include a combination of interest rate subsidies (applied to commercial loans offered to the entrepreneurs by ARDA partner banks), partial credit guarantees and contributions for the purchase of equipment. Such support schemes are provided by ARDA to a variety of sectors.

The concessionality of ARDA's support is minimized by the requirement that the entrepreneur also contributes equity (minimum 10% of the investment, actual level determined on a project-by-project basis by ARDA). Commercial lenders bear the risk of loan default for the portion of the loan that is not guaranteed by ARDA. The entrepreneurs bear the risk of losing their equity should the ventures fail. The project, in other words, does not create a risk-free profit opportunity for the private sector.

8.1.3 Cost-efficiency

The project will result in 16.14 million tCO₂eq of emission reductions over the project lifetime of 20 years. This equates to a mitigation cost to the GCF of EUR 2/tCO₂eq (see Chapter 9.1) and represents considerable value for money, particularly when the project's additional benefits (adaptation, economic-co-benefits etc.) are considered as well. Relevant international benchmarks for abatement costs in forestry sector are in the range of USD 5-20 tCO₂eq (Russia)⁵⁴¹ up to USD 30-40 /tCO₂eq (Australia).⁵⁴² For additional reference, the abatement cost of another approved GCF forestry project (FP19, Ecuador) is EUR 2.5/tCO₂eq. In terms of forestry projects on the voluntary carbon market, Voluntary Carbon Standard projects have an average market value of around USD 4-5/tCO₂eq. Comparing to these benchmarks, expected project's GHG emission reduction potential can be considered cost-effective.

8.2 Financial and economic assessment

8.2.1 Economic rate of return

Economic Rate of Return: The economic internal rate of return (EIRR) reflects two categories of incremental project benefits vs. baseline: (i) value of carbon sequestration from SFM activities and (ii) economic value added. The latter comprises: Incremental employment at the NFA and its contractors; (ii) incremental household income from adoption of EE stoves and related fuelwood savings; (iii) incremental profits for EE stove and USB producers, partially offset by profit decrease from sale of conventional stoves and fuelwood; (iv) incremental employment at USB producers. Based on a CO₂eq shadow price of EUR 24/t, the project produces an EIRR of 39%

⁵⁴¹ McKinsey 2009. Pathways to an energy and carbon efficient Russia.

⁵⁴² McKinsey 2008. An Australian Cost Curve for Greenhouse Gas Reduction.

and NPV, using a 10% discount rate conventionally used in similar economic analyses, is a positive EUR 88 million. EUR 24/t is the price of CO₂ allowances on the EU Emission Trading Scheme (the most liquid carbon market worldwide) as of mid-June 2019. It is also consistent with the European Commission's recommended CO₂ price assumption of EUR 25/t in its *Guide to Cost-Benefit Analysis of Investment Projects*.⁵⁴³ Carbon prices vary considerably across markets and over time. A sensitivity analysis indicates that, even with a ~60% decrease in carbon prices (to EUR 15/t) and a 20% decrease in economic value added, the EIRR would be 13%, above the 10% cost of capital used customarily in economic analyses. Additional, unquantified benefits come from the restoration of forest ecosystem, including avoided erosion, watershed protection, flood protection, biodiversity habitat, pollination and tourism revenues.

8.2.2 Financial internal rate of return

In Component 1 only Activity 1.1 (SFM implementation) and 1.3 (fuelwood supply) generate financial reflows for the sector (for NFA). Activities 1.2, 1.4 and 1.5 are entirely of public good nature and are suited to a grant. In Activity 1.1 and 1.3 the expected financial IRR (FIRR) without GCF support is 2.4% over 20 years, the time period conventionally used to evaluate the effectiveness of SFM projects. This is well below Georgia's financial cost of capital of ~8.5%.⁵⁴⁴ Concessionality is therefore required. Because the NFA would produce negative cash flows for the first 15 years (until the SFM interventions reach maturity) under the new SFM approach, loans – even concessional ones – are not advisable and a grant is the most appropriate level of concessionality. Specifically, a GCF grant of EUR 13.2 million, covering ~25% of capex in years 1-7 for these activities, would increase the FIRR to 9.7%, just above sovereign cost of capital.

In Component 2, financial reflows will be generated by the producers of EE technologies and AF. These producers, however, are supported by government financed investment support instruments and not via GCF funding (except technical assistance via TAISF). GCF finance support is foreseen in Activity 2.2 on consumer finance to replace conventional fuelwood stoves. The FIRR for a household that replaces a conventional stove with an EE one is 45% without GCF support. This is as a result of fuelwood savings over the EE stove's 10-year useful life, partially offset by the incremental price of an EE stove over a conventional one and related financing costs.⁵⁴⁵ The analysis assumes households will have to pay under the new fuelwood supply scheme of NFA an official fuelwood price of GEL 81/m³ (cost-covering price for NFA). As discussed in this Chapter, despite this positive FIRR, the widespread adoption of EE stoves is hindered by their high price point, product novelty and lack of sizable production or imports. A GCF grant covering 30% (up to GEL 300 or EUR 100) of the EE stove's price is therefore recommended to significantly kick-start the market for this new product.

⁵⁴³ European Commission 2014. Guide to Cost-Benefit Analysis of Investment Projects. Available online: https://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/cba_guide.pdf.

⁵⁴⁴ Yield on Georgia's 10-year (longest-dated) sovereign bonds as of mid-June 2019.

⁵⁴⁵ Assuming households finance the purchase of an EE stove with a microfinance loan bearing an effective interest rate of 30%.

8.3 Exit strategy and sustainability

The exit and sustainability strategy of the project focuses on a) anchoring approaches and methodologies in the legislative and regulative framework, b) creating financially self-sustaining structures (where necessary and possible) to avoid financial dependency on external sources and c) strengthening of institutions and individuals to perform their functions beyond the project's duration.

8.3.1 SFM (Component 1)

In general, the project is embedded in the ongoing national forestry sector reform in Georgia, which has high-level support and strong commitment from the Georgian government. The implementation of the reform country-wide is a long-term target and the project enables the kick-start of this implementation and provides the ground for replication (see Chapter 8.4). Beyond this, it is well aligned with Georgia's national climate policies and commitments, including the country's Nationally Determined Contribution to the NDC. The project enables Georgia to meet the conditional target of implementing SFM on at least 250,000 ha.

Furthermore:

- The creation of an enabling policy and regulatory environment for SFM and for market development of EE-AF at the national level ensures the long-term safeguard of the project approaches and benefits country-wide.
- Demonstrating the benefits and feasibility of the proposed SFM approach in 8 districts leads to secured continuous political buy-in and commitments to implement the sector reform in other districts and other forest management bodies
- Climate change risks (current and future) will be considered in forest management through in the target regions by improving the knowledge base on climate risks and suitable adaptation strategies for forest ecosystems. This especially addresses a major gap in information for Eastern Georgia, and will inform future planning, reporting and commitments (e.g. National Communication to UNFCCC, 2nd NDC, and National Adaptation Plans).

Financial exit strategy and sustainability

The implementation of SFM (Activity 1.1) and the fuelwood supply (Activity 1.3) is in the medium-term cost-covering and generates revenues for NFA (see Feasibility Study Chapters 8.1 and 8.2, and Annex 3 to the Funding Proposal - Financial and Economic Model) and is therefore financially sustainable. During project implementation, NFA will generate revenues from timber and fuelwood sale of ca. EUR 84.5 million alone (over 7 years). Financial model demonstrates that after 15 years of implementing SFM, NFA has sufficient resources to re-invest in establishing SFM system in other regions. These revenues are used for re-investment into equipment (in need of replacement and/or repair), as well as operations and maintenance costs for the sustained implementation of forestry operations.

Forest supervision by DES is a pure state-budget funded function. The government of Georgia committed itself to provide the necessary long-term funding for forest patrollers and inspector

staff, equipment replacement and operations and maintenance costs of equipment procured by government funding as well as GCF funding.

The FIMS and MRV to be established will increase efficiency of data collection, monitoring and analysis and thus will reduce costs. Once established, operations and maintenance costs will be covered by state budget commitments.

Institutional sustainability

Institutional sustainability is ensured by establishing the institutional and technical setup that sustains and expands the adoption of SFM by:

- Developing clear standard operating procedures, manuals, guidelines, and other supporting documents, which will be available to all existing and futures staff. These documents and approaches ensure that SFM is streamlined in the operations of forest management bodies and DES.
- Developing capacities (including specialized teams)⁵⁴⁶ in the public and private sector to practically implement SFM and for forest supervision (DES). This capacity development is not only implemented for staff in the target regions but also for head quarter staff and other regional branches of NFA and DES to pave the ground for replication (see also below on knowledge and training platform).
- Setting up a centralized knowledge management and training platform in EIEC that ensures long-term availability and continuation of training and knowledge materials and events after project finalisation to cater for ongoing learning needs of new/existing staff of MoEPA, NFA, DES and forest service companies in the future. By creating qualified staff and strengthening ownership over sustainability in the forestry sector via the platform future growth in the sector is enabled.

8.3.2 EE-AF Sector (Component 2)

For Component 2, the EE-AF market development, the sustainability is ensured via the following approaches:

- The key element of Project's sustainability as far as EE-AF market promotion is concerned is to create lasting demand for EE-AF products. This will be ensured by implementing and enforcing SFM: for as long as fuelwood supply will be managed by NFA and DES will prevent illegal logging, the need and demand for EE-AF among rural households will exist.
- The project's design involves several innovative elements, such as provision of energy advisory services to rural population, support to producers, involvement of financial sector, and the grant/incentive scheme with high leveraging potential. While none of these models alone can address all barriers associated with EE-AF market in rural areas, taken together and in combination with policy and regulatory support at national level, they offer an integrated package of scalable solutions aimed at removing barriers to market development and ensuring sustainable demand for and supply of EE-AF solutions on the rural market.

⁵⁴⁶ Specialized teams on restoration (natural regeneration and enrichment planting), cutting operations, timber transport, forest road and skidding road infrastructure development, and forest road maintenance.

Sustainability of market demand

A more formalized supply chain and a higher valuation of fuelwood as a result of new sector management model, along with strengthened consumer awareness will create lasting demand for EE-AF products among households, while EE public procurement policies will create demand for EE-AF in public sector. In addition, strict EE and environmental performance standards for EE stoves will gradually phase-out inefficient products from the market. Financial sector, banks and MFIs, will respond to this increase in demand with new, attractive consumer loan products for EE-AF. The GCF funded voucher programme will terminate in year 6 of project implementation, as does the awareness creation activities. At this point, the goal of the incentive scheme and awareness activities is achieved: EE stoves are adopted by 30,000 households and annual sales volume reaches at least 7,500 stoves. Due to economy of scale, the price of an EE stove will reduce significantly, while consumer awareness and confidence in the product enhances. A continuation of incentives is not necessary.

Sustainability of EE-AF supply

The need for and form of support required for EE-AF suppliers will largely be dictated by the prevailing market conditions and the strength of the demand. As regards TA support for the sector, it is expected that once high production/sales volumes (i.e. in the order of 7,500 – 10,000 stoves/year) are reached, there is no need any longer to build supplier's capacity for marketing, product quality, etc. As regards investment support, it will, most likely, continue after the project end through ARDA in line with Agency's mandate to promote sustainable rural development.

The project will ensure that in the long-run environmental considerations and promotion of investment in green rural growth are part of ARDA's program and capacities are in place to implement it. SIDA co-financing will contribute to this by building ARDA's capacities to design and implement investment support instruments for green and sustainable rural development. The (government funded) targeted financial support of EE-AF producers shall terminate in year 6 of the project (as per Project Implementation timetable). By that time ARDA will have mainstreamed green financing mechanism across all its operations and there won't be a need for a stand-alone E-AF support mechanism, such as TAISF.

In addition, Georgia's Partnership Fund is interested in supporting larger investment in the sector (over EUR 10 million) with its equity funding. By the project end, the scale of the sector and the demand will make such investment opportunity possible.

8.3.3 Gender equality and environmental mainstreaming (cross-cutting)

In regard to the sustainability of gender implemented equality and environmental mainstreaming in the project: ESS and gender management plans will be by the project. Several elements of the plans will be mainstreamed in the operations of NFA, DES and MoEPA to ensure continuation of ESS and gender equality practices after project end. In addition, ESS and gender training modules are part of the training platform at EIEC. Please refer to the ESMP for details. For ARDA specifically, SIDA will provide dedicated support to the institution to institutionalize ESS management systems for their entire portfolio.

8.4 Potential for scaling up and replication

There is substantial potential for scaling up and replication of SFM in Georgia: The 8 target districts, cover 14% of the forested area under NFA management.⁵⁴⁷ On NFA forest land alone, there is the potential to implement SFM on an additional ~1.5 million ha and the firm commitment by the Government to do so. This includes ~338,000 ha within the three project regions in the other 6 forest districts, and over 1.1 million ha outside of the three project regions. In addition, 805,000 ha of forest area are managed by other forest management bodies (e.g. Adjara Forestry Agency, Agency of Protected Areas, among others), which also are obliged to implement SFM under the new forest code. In the project approach, it will take 7 years for a fully operational SFM system and the enabling environment on the national level to be established. The latter one being a pre-condition for further up-scaling and replication. A gradual approach is needed to not over-burden NFA, DES and the private sector during the kick-start of the forest sector reform in the eight districts, as they need to develop capacities and make the necessary investments.

The learning experience from implementation in the target districts will lead to efficiency gains and therefore shorter implementation periods in other districts and regions. Enabling policy and regulatory environment for SFM will create sound basis for its scaling-up nation-wide. Further, re-investment mechanism of the revenues to be generated in the medium-term will support replication and scaling up in other districts and regions.

Investments in vocational education and training, and the knowledge management and training platform will further strengthen the capacities of existing employees (public and private sector), as well as future foresters and forest workers on SFM – enabling replication and scaling up in other regions of the country.

There is substantial potential for up scaling the EE-AF Market: There are about 100,000 households relying on fuelwood and conventional stoves in the target regions alone.⁵⁴⁸ This translates into effective annual demand for heating appliances of around 50,000 stoves.⁵⁴⁹ The project will be able to realistically tap only 30% of this demand by the project end. However, assuming producers will retain annual EE stove production at the same level (ca. 7,500 stove per year) by 2030 - 75% of the fuelwood users in target regions will switch to EE appliances. Nation-wide, there are 419,330 households relying on fuelwood for energy needs, a considerable market for both EE stove and adoption of AF. Potential for EE-AF market development is even greater if regional needs are considered: neighboring Armenia and Azerbaijan have similar rural energy consumption patterns and high reliance on fuelwood for heat supply.

⁵⁴⁷ Considering NFA forested areas of which are actually covered by forest (i.e. 1.88 million ha).

⁵⁴⁸ CENN, Caucasus Environmental NGO Network. 2016. Cost-Benefit Analysis Fuelwood vs. Alternative Heating Resources. Tbilisi, Georgia.

⁵⁴⁹ Maximum longevity of a conventional stove is 2 years, therefore annually at least half of stoves are being replaced.

9 CLIMATE, ENVIRONMENTAL AND SUSTAINABLE DEVELOPMENT IMPACTS AND BENEFITS

9.1 Carbon benefits

9.1.1 Sustainable Forest Management (SFM)

The mitigation potential in the project as a result of the introduction of SFM can be split into two impact components as illustrated in Figure 91 below.

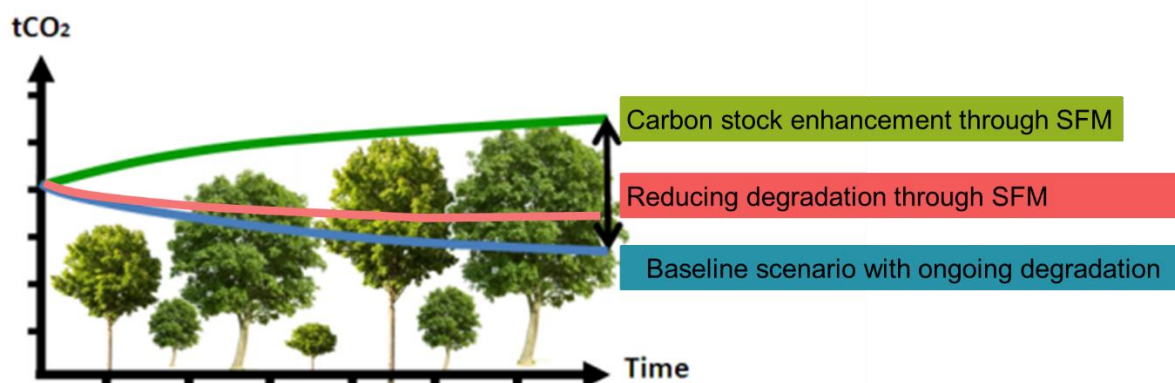


Figure 91: Mitigation concepts in the project as a result of the SFM introduction

Source: UNIQUE

In the past decades, Georgia and the project region has experienced significant loss of carbon within the forests, therefore for the baseline scenario of the project period of 7 years as well as the project lifetime of 20 years a continuous yet conservative forest degradation is assumed.

The transition towards practical application of SFM first requires an overall planning and implementation phase for the entire forest areas which includes elements such as multifunctional zoning, aiming to define ecological, environmental, social and other functions for all forest areas within a Forest Management Unit (FMU) with a view to balancing the sometimes divergent objectives of timber production, societal needs and nature conservation. This provides planners and managers alike with specific management prescriptions for particular forest sites depending on the identified forest functions. Direct implementation of these management prescriptions can range from better supervision, protection, to active silvicultural measures within the forests. The first impact will be the reduction of the degradation compared to the baseline via improved overall planning and better implementation of SFM. This impact component will affect all the forest areas where they will be just protected or also actively managed.

Secondly, those forests where direct silvicultural measures will be implemented such as promotion of natural regeneration, enrichment planting and single-tree promotion systems will actively increase carbon stocks over time. Such measure will be implemented only within those areas clearly identified as part of the multifunctional zoning, and therefore will exclude all protected areas or areas not being eligible due to any other reason (e.g. not accessible, steep slopes above 35°, high altitude forests, etc.).

These two impact components together sum up the total mitigation potential in this project as illustrated in Figure 92 below, which also highlights the main methodological approach followed for each of the two components – (1) reduced degradation and (2) enhancement of carbon stocks.

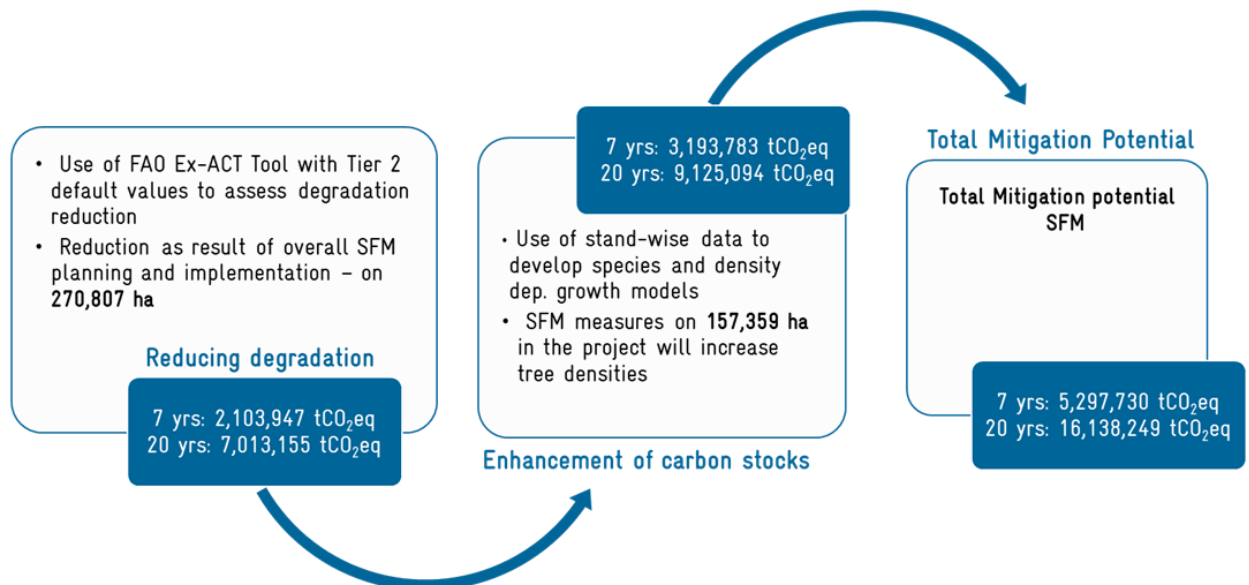


Figure 92: Mitigation potential in the project after 7 and 20 years for reducing forest degradation and enhancement of carbon stocks as a result of SFM implementation

Source: UNIQUE

In the next sub-chapters, the two impact components are presented in more detail including the methodological approach followed.

9.1.1.1 Reducing Forest Degradation under SFM in the project

Methodological approach

Based on the literature, field visits, expert interviews and stakeholder consultations conducted during project design, the underlying fact was confirmed that forests in Georgia and the project region respectively are degraded. However, given the lack of existing data, a representative historic degradation rate had to be derived, which then could be used to project future degradation. As described in Chapter 5.1.1, a degradation rate had to be established which is based on actual carbon stock change measurements within the forests, depicted in Figure 93.

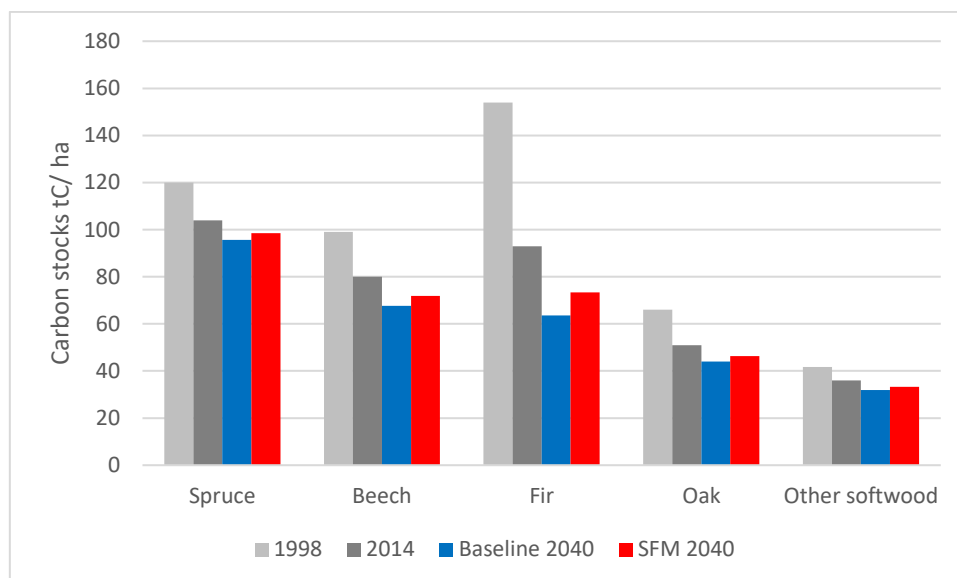


Figure 93: Historic degradation 1998 - 2014 and projection under baseline and SFM scenario

Source: UNIQUE based on ÖBF study 2015

After these steps, the FAO EX-Ante Carbon Balance Tool (EX-ACT)⁵⁵⁰ was calibrated separately for each forest formation with the compiled Georgian default values to assess potential degradation reduction over 20 years (Figure 94). This land use and fishery accounting tool is one of the most widely used tools for many accounting programs around the world and even is used by some countries for their national GHG accounting and reporting to the UNFCCC. The Tool was used in a IPCC Tier 2 modus since the both the carbon stock values (Figure 95) as well as the degradation rates (Figure 96) were derived based on national values with the exception of soil organic carbon for which the Tier 1 values of the tool were used. The following screenshots from the Tool illustrate the different entries and results, again shown exemplary for beech. The tools are available for all the different forest formations.

⁵⁵⁰ <http://www.fao.org/tc/exact/ex-act-home/en/>.

The EX-Ante Carbon-balance Tool (EX-ACT)

Start Description Land Use Change Crop production Grassland Livestock Management Degradation

Project Name Gerogia GCF Beech forests

Continent Eastern Europe

Climate Cool Temperate
Moisture regime Moist ? **Climate ?**

Dominant Regional Soil Type HAC Soils ? **Soil ?**

Duration of the Project (Years)

Implementation phase	6
Capitalisation phase	14
Duration of accounting	20

Figure 94: Calibration of the Tool

5.1. Forest degradation and management

? AEZ map Zone 1 = Temperate oceanic forest Zone 2 = Temperate continental forest
 Zone 3 = Temperate mountains systems Zone 4 =

Back

Use this part only if you want to refine the analysis with Tier 2 coefficients.

(default values are provided for your information only, while EX-ACT will use Tier 2 values automatically wherever specified)

Type of vegetation that will be degraded	Above-ground		Below-ground		Litter		Dead wood		Soil carbon	
	Default	Tier 2	Default	Tier 2	Default	Tier 2	Default	Tier 2	Default	Tier 2
Forest - Zone 1	56.4		14.1		21.00		0.0		95.0	
Forest - Zone 2	56.4	76.0	14.1	20.8	21.00	6.0	0.0	3.2	95.0	
Forest - Zone 3	61.1		13.4		21.00		0.0		95.0	

Figure 95: Entry of Tier 2 values (in green) for beach forest carbon stocks and degradation classes

5.1. Forest degradation and management

? AEZ map Zone 1 = Temperate oceanic forest Zone 2 = Temperate continental forest Zone 3 = Temperate mountains systems

Type of vegetation that will be degraded	Degradation level of the vegetation			Fire occurrence and severity			Area (ha)			
	Initial State	At the end		Without	Periodicity	Impact	With	Periodicity	Impact	Start
		Without project	With project	(y/n)	(year)	(% burnt)	(y/n)	(year)	(% burnt)	
Forest Zone 2	Extrem	Moderate	Low	NO	1	100%	NO	1	100%	150.633
Select the vegetation	Select level	Select level	Select level	NO	1	100%	NO	1	100%	
Select the vegetation	Select level	Select level	Select level	NO	1	100%	NO	1	100%	
Select the vegetation	Select level	Select level	Select level	NO	1	100%	NO	1	100%	
Select the vegetation	Select level	Select level	Select level	NO	1	100%	NO	1	100%	
Select the vegetation	Select level	Select level	Select level	NO	1	100%	NO	1	100%	
Select the vegetation	Select level	Select level	Select level	NO	1	100%	NO	1	100%	
Select the vegetation	Select level	Select level	Select level	NO	1	100%	NO	1	100%	

Figure 96: Specifying degradation levels in the baseline and the project and entry of the specific forest formation area in the project

Results

The results of the assessment using the Tool are presented in the following table. First the overall results are shown for the entire project area of 270,807 ha followed by the results of the specific forest formations.

Table 75: Mitigation potential in the project from the reduction of degradation, over 20 years of project lifetime and 7 years of project implementation

Total mitigation potential from degradation 270,807 ha	All GHG in tCO ₂ eq			
	Balance	Share per GHG of the Balance		Balance per year
		Biomass	Soil	
Total 20 years	7,013,155	4,951,384	2,061,771	350,658
Per hectare	25.9	18.3	7.6	
Per hectare per year	1.3	0.9	0.4	1.3
Total 7 years GCF	2,103,947	1,485,415	618,531	350,658

Table 76: Mitigation potential in the project from the reduction of degradation, per main (dominant species) forest formation types

Alder 16,184 ha	All GHG in tCO ₂ eq			
	Balance	Share per GHG of the Balance		Balance per year
		Biomass	Soil	
Total	169636	79820	89816	8482
Per hectare	10.5	4.9	5.5	
Per hectare per year	0.5	0.2	0.3	0.5

Beech 150,633	All GHG in tCO ₂ eq			
	Balance	Share per GHG of the Balance		Balance per year
		Biomass	Soil	
Total	4138312	2997036	1141275	206916
Per hectare	27.5	19.9	7.6	
Per hectare per year	1.4	1.0	0.4	1.4

Fir 23,321 ha	All GHG in tCO ₂ eq			
	Balance	Share per GHG of the Balance		Balance per year
		Biomass	Soil	
Total	1470803	1106124	364679	73540
Per hectare	63.1	47.4	15.6	
Per hectare per year	3.2	2.4	0.8	3.2

Hornbeam 32,464 ha	All GHG in tCO₂eq			
	Balance	Share per GHG of the Balance		Balance per year
		Biomass	Soil	
Total	419459	239290	180169	20973
Per hectare	12.9	7.4	5.5	
Per hectare per year	0.6	0.4	0.3	0.6

Oak 34,345 ha	All GHG in tCO₂eq			
	Balance	Share per GHG of the Balance		Balance per year
		Biomass	Soil	
Total	577182	346066	231116	28859
Per hectare	16.8	10.1	6.7	
Per hectare per year	0.8	0.5	0.3	0.8

Spruce 13,860 ha	All GHG in tCO₂eq			
	Balance	Share per GHG of the Balance		Balance per year
		Biomass	Soil	
Total	237764	183048	54716	11888
Per hectare	17.2	13.2	3.9	
Per hectare per year	0.9	0.7	0.2	0.9

9.1.1.2 Carbon Stock Enhancement under SFM in the project

Methodological approach

To date there exists no standardized method, tool or model which can be readily applied to ex-ante estimate the enhancement of carbon stocks within the forests as a direct impact of the introduction of SFM activities. As a clear distinction to avoided degradation (component 1 above), the enhancement of carbon stocks compared to a baseline is a result of silvicultural measures such as promotion of natural regeneration, enrichment planting and single-tree promotion systems which actively increase stand quality, increment and carbon stocks over time.

To predict the enhanced growth of the forests, simple growth models for the main species formations within the project region were derived on the basis of tree density classes (i.e. basal area tree density). These density classes represent the typical forest management indicator which is derived on a forest stand level during the elaboration of Forest Management Plans in Georgia. This study applied the following methodological steps to assess future SFM carbon stock enhancement:

1. Forest stand-wise FMP datasets from two forest districts (Akhalcikhe and Lanchkhuti)⁵⁵¹ were collected during the field mission; these two FMPs do not fall within the selected project region, however, the data of the FMPs contained all main forest formations also abundant in the project area and therefore serves as representative case study.
2. Preparation of the FMP datasets. First the forest stands were filtered to exclude all areas with slope inclination above 36° and areas above an altitude of 2,000 m.a.sl. This is in line with the economic forest model used in this study since it is assumed that no SFM measures are implemented above these thresholds. Next, the stand data were filtered to only represent the six species formations which are representative for the three target regions, namely: beech, oak, alder, hornbeam, spruce and fir formations. After this process the final dataset consisted of the following:
 - Akhalcikhe FMP: A total of 2,652 forest stands representing a forest area of 11,675 ha
 - Lanchkhuti FMP: A total of 1,391 forest stands representing a forest area of 7,171 ha
3. These two datasets were merged and analyzed to derive basal area density dependent strata for the different species formations for the GCF project area. These strata were used for this modeling as well as for the economic forest model. The total area of all strata where SFM measures will be implemented is 157,359 ha. The table below summarizes these strata with the parameters derived from the FMP datasets which are relevant for this modelling.
 To convert stocking volume data into biomass and further into carbon, species specific stand-volume to aboveground biomass equations were used from a validated SFM carbon accounting methodology developed for the domestic carbon market in China. This methodology provides an extensive list of default equations and values either for the relevant species or for the specific climate and eco-region (temperate moist) also representative in the target regions in Georgia⁵⁵². The validated SFM methodology follows Intergovernmental Panel on Climate Change (IPCC) guidance and was validated according to UNFCCC Clean Development Mechanism principles. The same source was used to apply default values and equations to include also below-ground biomass, litter and deadwood in the assessment of carbon stocks for the different strata in the table below. Overall the values derived for the carbon stocks can be considered conservative since they are below the values published in the national studies (see under Component 1 above).

⁵⁵¹ Note: The FMP from Lanchkhuti is not yet finalized (should be finalized in late 2019), however preliminary data was provided to the project preparation team to inform the modeling.

⁵⁵² The SFM methodology can be downloaded here: <http://www.forestry.gov.cn/uploadfile/thw/2015-1/file/2015-1-28-1925077d07f84e46bae5f5ff1b086eef.pdf>. A translated English version is available upon request.

Table 77: Forest strata derived from the FMP datasets and up-scaled to the project area (columns with ** were derived from NFA data for the three target regions in order to upscale the FMP datasets)

Forest Formation	Share of area % per Forest Formation**	Stand density group (basal area)	Share of area % per stand density group	Average Age	Average Volume per ha (m ³ ha ⁻¹)	SFM Management area in the GCF project (ha)**
Alder	6%	< 0.4	24%	17.0	22.7	1.902
Alder	6%	< 0.4	24%	30.0	60.5	333
Alder	6%	>0.7	48%	25.0	148.9	2.670
Alder	6%	>0.7	48%	30.2	172.4	1.861
Alder	6%	0.5 - 0.6	28%	20.3	69.2	2.043
Alder	6%	0.5 - 0.6	28%	31.0	108.8	594
Beech	51%	< 0.4	39%	15.0	6.8	5
Beech	51%	< 0.4	39%	44.5	34.5	93
Beech	51%	< 0.4	39%	74.5	80.5	8.143
Beech	51%	< 0.4	39%	104.5	96.0	7.555
Beech	51%	< 0.4	39%	134.5	126.5	18.325
Beech	51%	>0.7	4%	15.0	26.4	1
Beech	51%	>0.7	4%	44.5	133.6	9
Beech	51%	>0.7	4%	74.5	293.0	780
Beech	51%	>0.7	4%	104.5	349.5	723

Forest Formation	Share of area % per Forest Formation**	Stand density group (basal area)	Share of area % per stand density group	Average Age	Average Volume per ha (m ³ ha ⁻¹)	SFM Management area in the GCF project (ha)**
Beech	51%	>0.7	4%	134.5	363.0	1.755
Beech	51%	0.5 - 0.6	57%	15.0	14.3	8
Beech	51%	0.5 - 0.6	57%	44.5	72.3	136
Beech	51%	0.5 - 0.6	57%	74.5	149.7	11.966
Beech	51%	0.5 - 0.6	57%	104.5	178.5	11.102
Beech	51%	0.5 - 0.6	57%	134.5	203.3	26.929
Fir	8%	< 0.4	12%	70.0	126.6	1.154
Fir	8%	< 0.4	12%	90.0	64.0	220
Fir	8%	< 0.4	12%	150.0	442.0	306
Fir	8%	>0.7	13%	70.0	416.5	565
Fir	8%	>0.7	13%	90.0	492.0	502
Fir	8%	>0.7	13%	130.0	454.0	675
Fir	8%	0.5 - 0.6	75%	69.2	232.6	4.240
Fir	8%	0.5 - 0.6	75%	91.7	343.3	5.064
Fir	8%	0.5 - 0.6	75%	130.0	350.0	173
Fir	8%	0.5 - 0.6	75%	150.0	373.0	102
Fir	8%	0.5 - 0.6	75%	190.0	418.0	550

Forest Formation	Share of area % per Forest Formation**	Stand density group (basal area)	Share of area % per stand density group	Average Age	Average Volume per ha (m ³ ha ⁻¹)	SFM Management area in the GCF project (ha)**
Hornbeam	11%	< 0.4	60%	22.5	19.1	4.051
Hornbeam	11%	< 0.4	60%	37.2	46.2	6.685
Hornbeam	11%	< 0.4	60%	62.7	85.7	648
Hornbeam	11%	0.5 - 0.6	40%	24.0	38.3	322
Hornbeam	11%	0.5 - 0.6	40%	41.2	83.0	4.922
Hornbeam	11%	0.5 - 0.6	40%	64.4	138.7	2.237
Oak	12%	< 0.4	39%	44.5	29.4	5.543
Oak	12%	< 0.4	39%	66.8	45.6	1.914
Oak	12%	< 0.4	39%	93.3	63.6	322
Oak	12%	>0.7	4%	50.0	113.9	227
Oak	12%	>0.7	4%	72.0	165.8	141
Oak	12%	>0.7	4%	102.0	182.4	377
Oak	12%	0.5 - 0.6	57%	25.0	32.0	80
Oak	12%	0.5 - 0.6	57%	46.9	61.6	5.310
Oak	12%	0.5 - 0.6	57%	68.6	84.7	4.039
Oak	12%	0.5 - 0.6	57%	91.7	102.2	2.004
Spruce	5%	< 0.4	26%	20.0	36.0	2

Forest Formation	Share of area % per Forest For- mation**	Stand density group (basal area)	Share of area % per stand density group	Average Age	Average Volume per ha (m ³ ha ⁻¹)	SFM Management area in the GCF project (ha)**
Spruce	5%	< 0.4	26%	47.8	79.9	498
Spruce	5%	< 0.4	26%	67.9	118.4	987
Spruce	5%	< 0.4	26%	91.8	159.1	562
Spruce	5%	< 0.4	26%	130.0	180.8	20
Spruce	5%	< 0.4	26%	150.0	151.0	18
Spruce	5%	>0.7	12%	46.9	284.1	89
Spruce	5%	>0.7	12%	69.8	347.4	249
Spruce	5%	>0.7	12%	93.9	409.2	401
Spruce	5%	>0.7	12%	129.2	533.6	151
Spruce	5%	>0.7	12%	150.0	546.0	38
Spruce	5%	0.5 - 0.6	63%	47.9	165.6	525
Spruce	5%	0.5 - 0.6	63%	69.1	208.5	2.524
Spruce	5%	0.5 - 0.6	63%	92.5	264.2	1.864
Spruce	5%	0.5 - 0.6	63%	130.0	280.7	125

4. For each stratum, a simple growth model was derived based on the FMP data and the Chapman-Richards growth function $y(t) = y_{\max}[1 - e^{-kt}]^p$. This function has been a popular model for describing the growth of various tree and forest stand growth variables around the world⁵⁵³. The process of model development is exemplarily shown for the beech strata being by far the most important forest formation in the project area:

Table 78: Age dependent stocking volume data per stand density group for beech; data derived from the FMP dataset

Average Volume per ha, density group 0.4 (m ³ ha ⁻¹)	Average Volume per ha, density group 0.5 – 0.6 (m ³ ha ⁻¹)	Average Volume per ha, density group >0.7 (m ³ ha ⁻¹)	Average Age
6.8	14.3	26.4	15
34.5	72.3	133.6	45
80.5	149.7	293.0	75
96.0	178.5	349.5	105
126.5	203.3	363.0	135

5. By applying the Chapman-Richards growth function to this dataset, the following growth models are derived for beech (Figure 97):

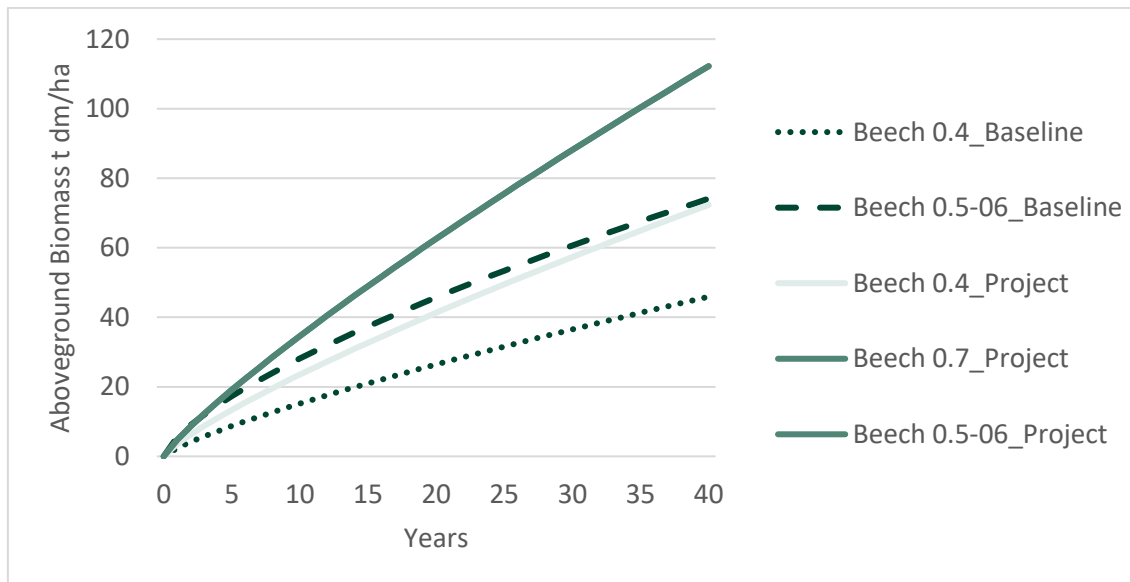


Figure 97: Established Chapman-Richards biomass density growth models for Beech⁵⁵⁴

⁵⁵³ See for example <https://blogg.slu.se/forest-biometrics/2017/03/11/the-chapman-richards-growth-function/>

⁵⁵⁴ Note: The lines for beech 0.7 and 0.5-0.6 overlap, and appear as 1 line.

6. The above graph shows the baseline growth modes as well as the assumed SFM models in the project. The logic applied here to reflect the assumption of increased growth and enhanced carbon stocks respectively was to apply the different growth models in way to assume that:
 - a. All strata with a density of 0.4 will increase to at least a density of 0.5-0.6 as a result of SFM implementation - therefore the density growth model 0.5-0.6 is used in the project instead of the baseline growth model 0.4
 - b. All strata with a density of 0.5-0.6 will increase to a density of above 0.7 as a result of SFM implementation - therefore the density growth model >0.7 is used in the project instead of the baseline growth model 0.5-0.6
 - c. The baseline growth model for 0.7 density is used both for the baseline and project
7. This modelling was done for all other forest formations and the ha-based models were then used to derive the total baseline as well as project scenario under SFM for the total area of 157,359 ha.

Results

Figure 98 and

Table 79 below show the total carbon stocks over 20 years under baseline and project conditions in tCO₂eq which includes aboveground, belowground biomass of trees, deadwood and litter. This final project model also includes the deduction of carbon as a result of the harvesting on an annual basis both in the baseline and the project scenario derived from the economic forest model developed in this study. The baseline scenario for this element of the analysis (i.e. carbon stock changes due to SFM) does not include the historic trend of forest degradation since this is accounted for in the degradation scenario (the first element calculated).

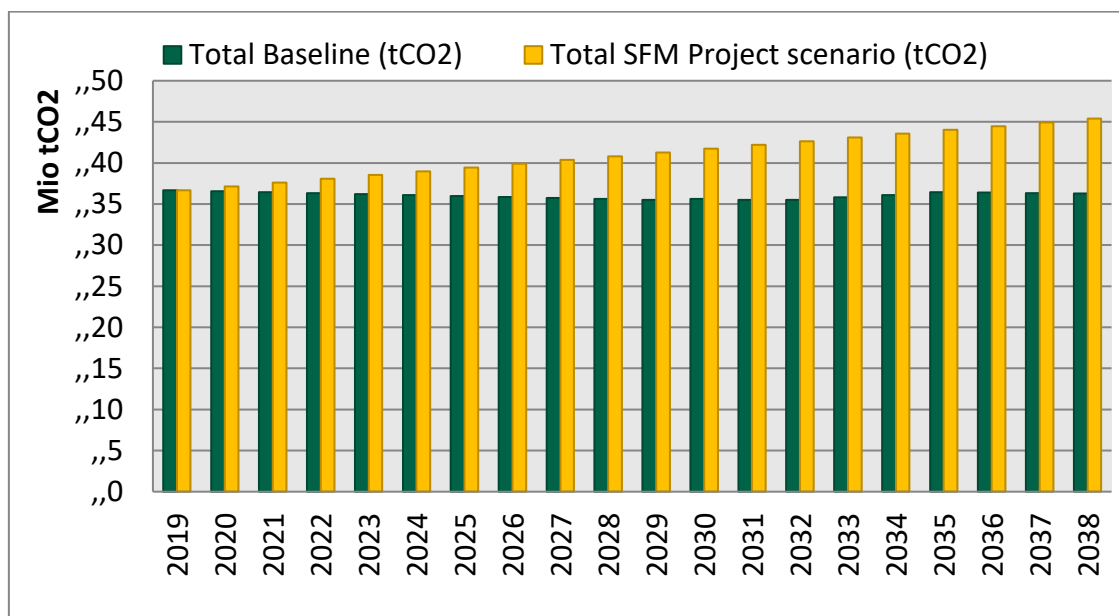


Figure 98: Total projected carbon stock changes in the baseline and the project scenarios as a result of SFM implementation (tCO₂eq)

Table 79: Total results carbon stock enhancement as a result of SFM implementation in the project area

Year	Total Baseline (tCO ₂)	Total SFM Project scenario (tCO ₂)	Difference Project - Baseline scenario tCO ₂	Annual Net Benefits (tCO ₂ / year)
2019	36,690,479	36,690,479	0	0
2020	36,573,346	37,148,628	575,282	575,282
2021	36,456,212	37,606,777	1,150,565	575,282
2022	36,339,079	38,064,926	1,725,847	575,282
2023	36,221,945	38,523,075	2,301,129	575,282
2024	36,104,812	38,981,224	2,876,412	575,282
2025	35,987,679	39,439,372	3,451,694	575,282
2026	35,870,545	39,897,521	4,026,976	575,282
2027	35,753,412	40,355,670	4,602,258	575,282
2028	35,636,278	40,813,819	5,177,541	575,282
2029	35,519,145	41,271,968	5,752,823	575,282
2030	35,634,875	41,730,117	6,095,241	342,418
2031	35,517,742	42,188,265	6,670,524	575,282
2032	35,506,671	42,646,414	7,139,744	469,220
2033	35,800,471	43,104,563	7,304,092	164,348
2034	36,097,391	43,562,712	7,465,321	161,230
2035	36,448,283	44,020,861	7,572,578	107,257
2036	36,389,392	44,479,010	8,089,618	517,039
2037	36,330,025	44,937,159	8,607,134	517,516
2038	36,270,213	45,395,307	9,125,094	517,961
Total benefits after 20 years (tCO₂)				9,125,094
Total benefits after 7 years (tCO₂)				3,193,783⁵⁵⁵
Annual carbon stock enhancement (tCO₂ year⁻¹)				456,255

⁵⁵⁵ The annual average was used to derive the project benefits for the first 7 years.

Year	Total Baseline (tCO ₂)	Total SFM Project scenario (tCO ₂)	Difference Project - Baseline scenario tCO ₂	Annual Net Benefits (tCO ₂ / year)
Average carbon stock enhancement rate (tCO ₂ year ⁻¹ ha ⁻¹)				2.9

9.1.2 Energy Efficiency and alternative fuels

GHG emission reduction estimation methodology

Wide-scale adoption of EE and AF solutions by rural household will lead to substantial reduction in fuelwood consumption and consequently in GHG emissions too. This impact has been estimated based on a combination of UNFCCC Small-scale Methodologies AMS-I.E.: Switch from non-renewable biomass for thermal applications by the user. Version 9.0⁵⁵⁶ and AMS-II.G.: Energy efficiency measures in thermal applications of non-renewable biomass. Version 10.0⁵⁵⁷. AMS-II.G comprises efficiency improvements in thermal applications of non-renewable biomass, including the introduction of high efficiency biomass fired project devices. AMS-I.E comprises of activities to displace the use of non-renewable biomass by introducing various renewable energy technologies.

GHG emission reduction from adoption of EE stoves: AMS. II-G assumes that in the absence of the project activity, the baseline scenario would be the projected use of fossil fuels to meet similar thermal energy needs as those provided by the project devices. Emissions reduction are calculated as follows:

$$ER = B \times N \times f(NRB, y) \times NCV_{biomass} \times EF(projected_fossil\ fuel) \quad \text{Equation (1)}$$

Equation (1)Where:

B	=	Quantity of woody biomass that is saved in tonnes per cookstove device of type i and batch j during year y
$f(NRB, y)$	=	Fraction of woody biomass that can be established as non-renewable biomass ($fNRB$) ⁵⁵⁸
$NCV_{biomass}$	=	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.0156 TJ/tonne, based on the gross weight of the wood that is 'air-dried')
$EF(projected_fossilfuel)$	=	Emission factor for the fossil fuels projected to be used for substitution of non-renewable woody biomass by similar consumers. Use a value of 63.7 tCO ₂ /TJ ⁵⁵⁹
N	=	Number of project devices of type i and batch j operating during year y

⁵⁵⁶ <https://cdm.unfccc.int/methodologies/DB/IOSFJLJFWT91R6B8SO5BC7TXSK27I2>.

⁵⁵⁷ <https://cdm.unfccc.int/methodologies/DB/HLXIKEIBAXBE4EHO24H5IAB824MBD8>.

⁵⁵⁸ Default values endorsed by designated national authorities and approved by the Board are available at <http://cdm.unfccc.int/methodologies/standard_base/index.html>.

⁵⁵⁹ This value represents the emission factor of the substitution fuels likely to be used by similar users, on a weighted average basis. The value is calculated, based on the global average ratio of cooking fuels (the normalized ratio of kerosene and liquefied petroleum gas (LPG) excluding coal), i.e. 9 per cent for kerosene (71.5 t CO₂/TJ) and 91 per cent for LPG (63.0 t CO₂/TJ).

B due to implementation of efficient thermal devices is estimated as per the following formula:

$$B = HR/NCV_{biomass} \times (1/\eta_{(old)} - 1/\eta_{(new)}) \quad \text{Equation (2)}$$

Equation (2) Where:

HR	=	Useful thermal energy output delivered per stove annually (TJ)
$\eta_{(old)}$	=	Efficiency of the old stoves
$\eta_{(new)}$	=	Efficiency of the new EE stoves

GHG emission reduction from switch to alternative fuels: AMS-I.E assumes that in the absence of the project activity, the baseline scenario would be the use of fossil fuels for meeting similar thermal energy needs. Baseline emissions would be calculated as:

$$BE = B \times f(NRB) \times NCV_{biomass} \times EF(projected_fossil_fuel) \quad \text{Equation (3)}$$

Equation (3)

Equation (4)Where:

BE	=	Annual baseline emissions in t CO ₂ e
B	=	Quantity of woody biomass that is substituted or displaced
$f(NRB)$	=	Fraction of woody biomass used in the absence of the project activity in year y that can be established as non-renewable biomass (f_{NRB}) ⁵⁶⁰
$NCV_{biomass}$	=	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.0156 TJ/ton)
$EF(projected_fossil_fuel)$	=	Emission factor for the substitution of non-renewable woody biomass by similar consumers. Use a value of 63.7 t CO ₂ /TJ

B has been calculated as the product of the number of households multiplied by the estimate of average annual consumption of woody biomass per household that is displaced by the project (tonnes/household/year):

$$B = N_{HH} \times BC(BL, HH) \quad \text{Equation (4)}$$

Equation (5)Where:

N_{HH}	=	Number of households in the project activity, number
$BC(BL, HH)$	=	Average annual consumption of woody biomass per household before the start of the project activity, tons/household/year

⁵⁶⁰ Default values endorsed by designated national authorities and approved by the Board are available at <http://cdm.unfccc.int/methodologies/standard_base/index.html>.

Finally, B is multiplied by a net to gross adjustment factor of 0.95 to account for leakages.

Table below presents input values used in the calculations of GHG emission reduction resulting from adoption of EE and AF solutions by rural households.

Table 80: Inputs to estimate GHG emissions reductions from EE and AF

Parameter	Value	Source
Inputs for AMS II-G		
Number of EE stoves by project end, #	30 730	Estimated based on availability of financial incentives
Useful thermal energy output delivered per project device, kWh	6 067	Calculated based on baseline analysis of household energy demand assuming the same level of energy service and thermal comfort in the BAU and project scenario (see Chapter 5.1.3.1)
Efficiency of old devices being replaced, %	35%	Lazashvili (2012) Energy and Economic Reasoning of Large-scale Implementation of Energy Efficient Living Stoves
Efficiency of the project device, %	75%	Conservative benchmark for minimum efficiency of stove in line with EU Ecodesign directive
Factor to convert kWh to TJ	0,0000036	AMS II-G
Inputs for AMS-I.E		
Number of households in the project activity switching to AF by project end	28 789	Estimated based on availability of raw materials for USB manufacturing in the target regions (see Chapter 5.3.3.2 of the FS)
Average annual consumption of woody biomass per household before the start of the project activity, m ³ /household/year	8	Average based on multiple studies, including CENN 2016, Geostat 2017, etc
Leakage factor	0,95	AMS-I.E
tonne/m ³ in Georgia	0,685	Assumption based on NAMA NS-229 - Efficient use of biomass for equitable, climate proof and sustainable rural development
Default values		
Fraction of woody biomass that can be established as non-renewable biomass (fNRB)	0,74	https://cdm.unfccc.int/DNA/fNRB/index.html
Net calorific value of the non-renewable woody biomass that is substituted, TJ/tonne	0,0156	Default as per AMS. II-G, version 10.0

Parameter	Value	Source
Emission factor for the fossil fuels projected to be used for substitution of non-renewable woody biomass by similar consumers, t CO ₂ /TJ	63,7	Default as per AMS. II-G, version 10.0

Results

The following estimates of annual GHG emission reduction has been obtained by applying formulas (1) – (4):

Table 81: GHG emissions reductions from EE stoves and alternative fuels

Annual GHG emission reduction...	EE stoves (AMS II-G) (tCO ₂ eq)	Alternative fuels (AMS I-E) (tCO ₂ eq)
Per household per year	5.9	3.8
By project end	180,284	110,210

Estimates of sector-wide lifetime GHG emission reductions during project duration (direct) and during project influence period (indirect)

In the next step project GHG emission reduction has been estimated following the Guidance for the Global Environmental Facility (GEF) projects⁵⁶¹, which has been specifically designed to capture a wide-ranging impacts of sector-wide market transformation initiatives.

To derive estimates of the project-level GHG emission reduction impact, market development scenarios for EE and AF sectors have been constructed. Baseline scenario assumes continuation of the current level of EE stove and AF sales, whereas GCF Scenario assumes an accelerated market growth rates during the project and after the project end until 2030, i.e. 55% for EE stoves and 35% for alternative fuels. The duration of post-project influence period has been chosen to coincide with NDC time-frame.

Finally, to calculate resulting GHG emission reductions the following algorithm has been applied:

- Estimate annual additional EE stove sales as difference between GCF and baseline scenario;
- Estimate annual life-time GHG emission reduction by multiplying number of EE stoves by the minimum useful life-time of the stove (10 years)
- Sum up GHG emission reduction project implementation period (direct) and during project influence period (indirect).

Table 82 and Table 83 present results of EE-AF sector scenario development and corresponding GHG emissions reduction during project duration (direct) and during project's influence period (indirect). It is estimated that the direct GHG emission reduction from EE-AF sector will account for 1.83 million tCO₂e by the project end and additionally 6.59 million tCO₂e will be reduced over the project's influence period.

⁵⁶¹ https://www.thegef.org/sites/default/files/council-meeting-documents/C.33.Inf_.18_Climate_Manual_1.pdf.

Table 82: Direct GHG emission reduction from EE-AF sector

Project Period									
	BAU	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Total (project)
EE stoves	500	500	2,000	2,500	5,000	5,000	7,500	7,500	-
Incremental EE stoves	-	-	1,500	2,000	4,500	4,500	7,000	7,000	
AF, t	3,500	4,725	6,379	8,611	11,625	15,694	21,187	28,603	
Incremental AF, t	-	1,225	2,879	5,111	8,125	12,194	17,687	25,103	
AMS II-G (EE), tCO ₂ eq	-	-	88,000	117,333	264,000	264,000	410,667	410,667	1,554,667
AMS I-E (AF), tCO ₂ eq	-	4,690	11,021	19,567	31,106	46,682	67,710	96,099	276,874
Total	-	4,690	99,021	136,901	295,106	310,682	478,377	506,765	1,831,541

Table 83: Indirect (post-project) GHG emission reduction from EE-AF sector

Project Period														
	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Total (post-project)
EE stoves	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	-
Incre- mental EE stoves	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	
AF, t	28,603	28,603	28,603	28,603	28,603	28,603	28,603	28,603	28,603	28,603	28,603	28,603	28,603	
Incre- mental AF, t	28,603	28,603	28,603	28,603	28,603	28,603	28,603	28,603	28,603	28,603	28,603	28,603	28,603	
AMS II-G (EE), tCO ₂ eq	410,667	410,667	410,667	410,667	410,667	410,667	410,667	410,667	410,667	410,667	410,667	410,667	410,667	5,338,667

Project Period														
	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Total (post-project)
AMS II-G (AF), tCO ₂ eq	96,099	96,099	96,099	96,099	96,099	96,099	96,099	96,099	96,099	96,099	96,099	96,099	96,099	1,249,283
Total	506,765	506,765	506,765	506,765	506,765	506,765	506,765	506,765	506,765	506,765	506,765	506,765	506,765	6,587,949

9.2 Climate change adaptation benefits

The project will increase the resilience of 270,807 ha of forests through the implementation of sustainable forest management. Strengthened resilience will be enabled by the:

- **Forest vulnerability assessments to inform sustainable forest management based on climate-responsive planning processes and management.** Three climate risk and vulnerability assessments for forest ecosystems at the regional level will be carried out. This will fill a key information gap at the regional level, related to climate change risks and potential consequences, as well as suitable adaptation strategies that can be integrated into FMPs and annual plans. Recommendations will also be made to strengthen the monitoring of climate adaptation within FIMS. Ultimately as a result of this action there will be strengthened awareness of climate risks, risk-reduction processes/ practices, and increased generation use of climate information in decision making.
- **Consideration of climate change risks (current and future) in forest management planning, and integration of suitable adaptation strategies into management plans** (amendments to FMPs, and mainstreamed into annual plans). This could include integrated fire management practices, the promotion of reforestation with resilient native species, forest regeneration on degraded slopes, maintenance of forest/ vegetative buffer zones along waterways, and improved forest health through regeneration, among others tailored to the local context (Table 84). Such activities will enable climate-responsive management, and ultimately reduce the exposure and improve the response to climate risks and threats.

Table 84: Examples of climate-resilient measures to be promoted through the project

Potential Climate Risks and Impacts	Measures integrated into the project
Increase in forest fires due to increasing temperatures, and prolonged dry periods (particularly in summer).	<ul style="list-style-type: none"> ▪ Strengthened forest management planning, based on up-to-date and robust forest inventories. ▪ Integration of forest fire management (preventative practices, and quick response plans in FMPs and annual plans) ▪ Training for NFA staff on best practices for fire management, procurement of firefighting equipment for regional offices ▪ Improvement of monitoring of forest conditions, including the identification high-risk conditions. ▪ Improvement of forest access road network to increase access to affected areas ▪ Public awareness campaigns on the importance of forests, will also include information on forest fire risks and prevention
Increased or intense precipitation may lead to flooding and/ or landslides.	<ul style="list-style-type: none"> ▪ Strengthening of forest management planning, based on up-to-date and robust forest inventories. ▪ Restoration of forests in high sloped areas, including those prone to landslides, will help stabilize such areas. ▪ Forests can play a protective function along riverbanks and other waterways, and the restoration of buffer zone forests will be promoted in FMPs. ▪ Restoration of degraded forests or bare areas, based on FMP, in other vulnerable areas for erosion control, or other protective functions.

Potential Climate Risks and Impacts	Measures integrated into the project
	<ul style="list-style-type: none"> Public awareness campaigns on the importance of forests, will also include information on the protective functions of forests.
Pests and disease may increase with climate change.	<ul style="list-style-type: none"> Strengthened forest management planning, based on up-to-date and robust forest inventories. Improved collection of forest information, and monitoring of forest condition will enable climate-responsive planning, and active management if any pests and diseases emerge as problems. Where necessary, implementation of sanitary cutting of infected tree species to slow down the spread of pests and disease. SFM to increase diversity (age classes, species composition, and improve the quality of stands to natural conditions in degraded areas, where healthier forests are able to better withstand pest and disease, and other climatic changes, risks and natural disasters. Appropriate silvicultural practices to be designed based on forest conditions/ context (based on approved FMPs).⁵⁶²

- **Implementation of FMPs, and adoption of adaptive ecosystem-based management strategies**, involving the continuous improvement of practices and active monitoring, including forest and climate-relevant indicators within FIMS.
- **Increasing awareness of local people of the multiple benefits, including climate benefits, of forest ecosystems and SFM for climate change mitigation and adaptation.** Participatory planning approaches will further enable local people to inform FMP development, including considerations to strengthen the resilience of forests and local forest-dependent communities.
- **Mainstreaming of best practices for climate change adaptation planning in forest ecosystems into training modules**, guidelines, and protocols of forest management and supervision bodies. This will guide forest sector practitioners to take into consideration climate change, and operationalize suitable adaptation strategies.
- **Strengthening of human capacities for adaptive management for forest sector actors** (MoEPA, NFA, DES, and private sector contractors) through providing trainings on best practices for SFM, including information on relevant climate risks, adaptation strategies, monitoring and evaluation. Workers, managers and other key sector stakeholders will thus be better equipped to plan, implement and monitor and evaluate the effectiveness of adaptive strategies.
- **Improved cooperation and coordination on adaptation in forest ecosystems through the NFP multi-stakeholder working groups and plenary meetings**, where a national dialogue on adaptation strategies for forest ecosystems will be established. Best practices, experiences, lessons learned and other knowledge will be shared and discussed within the working

⁵⁶² E.g. Support the natural regeneration of mature forest stands with diminishing quality, and a reduced ability to react to climate change. In this instance, measures could include clearing rhododendron to enable regeneration in the understory, supporting enrichment planting (if necessary), and supporting grazing control measures (e.g. fencing). Specific measures to be highlighted in FMPs and annual plans, based on recent forest management inventories.

groups engaging CSOs, academia, private sector, among other stakeholders, strengthening their adaptive capacities.

- Finally, forest vulnerability assessments, integrated adaptive ecosystem-based management practices, and improved information on climate change and its impacts on forest ecosystems will **inform and support the country's national climate dialogue. The Fourth National Communication to UNFCCC** is in the planning phase where the project target regions (Kakheti, Mtskheta-Mtianeti and Guria) are included to assess climate risk impacts and the forestry sector is included as one of the priority areas in the upcoming **National Adaptation Plan**. Information from the project will inform these reports, plans and strategies. Finally, the project's activities will inform the country's second NDC to the UNFCCC, which will cover the period from 2025 to 2030.

9.3 Sustainable development benefits

9.3.1 Environmental benefits

In addition to climate benefits, the project will generate substantial environmental benefits, supporting Georgia's commitments to the sustainable development goals (SDGs, see following Table):

Table 85: Summary of project environmental benefits and their contribution to the sustainable development goals (SDGs)

SDG	Examples of relevant SDG target	Example of how the project contributes to SDG
SDG 6 “Clean Water and Sanitation” Ensure availability and sustainable management of water and sanitation for all	<ul style="list-style-type: none"> ▪ 6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes 	<ul style="list-style-type: none"> ▪ Reduction of sedimentation and erosion in waterways, improving water quality due to the adoption of SFM on 270,807 ha. Over two-thirds of Georgia’s forests are located on medium and high inclination slopes, thus carry out key soil-protecting, water-preserving, water-regulating, sanitary and other protective functions.⁵⁶³ ▪ Maintenance of forested buffer zones along waterways to, and where necessary restoration of such areas to ensure their protective function is maintained.⁵⁶⁴ ▪ Improvement of water regulation and quality through SFM.⁵⁶⁵
SDG 7 “Affordable and Clean Energy” Ensure access to affordable, reliable, sustainable and modern energy for all +	<ul style="list-style-type: none"> ▪ 7.1 By 2030, ensure universal access to affordable, reliable and modern energy services ▪ 7.3 By 2030, double the global rate of improvement in energy efficiency ▪ 7.B By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries [...] 	<ul style="list-style-type: none"> ▪ Improved access to modern energy efficient technology that is more sustainable, and promotes alternative fuels that reduces the unsustainable consumption of fuelwood. ▪ Provision of air-dried Fuelwood to the local population. Dry fuelwood is more energy efficient than the ‘often undried/ not fully dried’ fuelwood which is currently supplied to/ harvested by local people, which is energetically less efficient (i.e. the higher the moisture value, the lower the net calorific heating value of wood).⁵⁶⁶ ▪ Improved management of the fuelwood value chain will secure affordable and reliable energy sources for the local population, reducing uncertainty and energy poverty.⁵⁶⁷ SFM ensures that fuelwood is not used beyond the amount that can be supplied on a sustainable

⁵⁶³ USAID 2017.

⁵⁶⁴ Ibid.

⁵⁶⁵ More information on SFM and water resources can be found in the following publication: https://www.foresteurope.org/documentos/Forests_and_Water.pdf.

⁵⁶⁶ Huhtinen 2006.

⁵⁶⁷ WECF 2016

SDG	Examples of relevant SDG target	Example of how the project contributes to SDG
		basis shifting forests from over exploitable resources. Energy efficient technologies and alternative fuels eliminate the gap fuelwood demand and supply.
SDG 12 “Responsible Consumption and Production” Ensure sustainable consumption and production patterns	<ul style="list-style-type: none"> ▪ 12.2 By 2030, achieve the sustainable management and efficient use of natural resources ▪ 12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities 	<ul style="list-style-type: none"> ▪ More efficient use of natural resources through the provision of sustainably harvested and dried fuelwood,⁵⁶⁸ and through investments in energy efficient technologies and alternative fuels to close the fuelwood gap. ▪ Introduction of green public procurement
SDG 13 “Climate Action” Take urgent action to combat climate change and its impacts	<ul style="list-style-type: none"> ▪ 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries ▪ 13.2 Integrate climate change measures into national policies, strategies and planning ▪ 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning 	<ul style="list-style-type: none"> ▪ Reduction of GHG emissions due to the adoption of SFM (reduced degradation and enhancement of carbon stocks), and the adoption of more efficient technologies (see Chapter 9) ▪ Strengthening of forest ecosystems’ resilience to climate change (see Chapter 9), including through strengthening the protective function of forests, and restoring ecosystem health and diversity.⁵⁶⁹
SDG 15 “Life on Land” Protect, restore and promote sustainable use of terrestrial ecosystems, sus-	<ul style="list-style-type: none"> ▪ 15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally 	<ul style="list-style-type: none"> ▪ Improved provision of ecosystem services.⁵⁷⁰ SFM will reverse ongoing degradation trends, which currently lead to the reduced provision of ecosystem services, and loss of biodiversity. Mountain ecosystems are a core focus of the project, given that 98% of Georgia’s forests are in hilly and mountainous areas. Climate-responsive measures to be implemented that consider the higher vulnerability

⁵⁶⁸ Huhtinen 2006.

⁵⁶⁹ Forests can stabilize areas that are prone to landslides, or along river Banks (areas prone to sedimentation, flooding, erosion and riverbank cutting); FAO 2010; FAO 2011.

⁵⁷⁰ FAO 2010.

SDG	Examples of relevant SDG target	Example of how the project contributes to SDG
tainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	<ul style="list-style-type: none"> ▪ 15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development ▪ 15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species ▪ 15.A Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems 	<p>of mountainous ecosystems, and suitable adaptation strategies contributing to the sustainable management of and ultimately conservation of mountain ecosystems.⁵⁷¹</p> <ul style="list-style-type: none"> ▪ Enhancement of biodiversity through SFM, considering improved planning processes (forest inventories, forest use zoning, and participatory multi-stakeholder processes), and implementation of SFM at scale. Improved monitoring of biodiversity through investments in FIMS, SFM planning processes and management activities. ▪ Protection of endemic species and restoration and rehabilitation of degraded forests through SFM. Targeted silvicultural practices will aim to restore ecosystem health, and diversity (improving species variety, supporting diverse age classes in degraded areas).⁵⁷² SFM can reduce the incidence of and impacts from landslides,⁵⁷³ support river bank stabilization, enhance soil carbon, improve soil moisture, among other benefits.⁵⁷⁴ ▪ Generation of additional revenues from SFM in the long-term, which can be reinvested in SFM in the entire country.

⁵⁷¹ FAO 2010; Stritih and Stritih 2018.

⁵⁷² Stritih and Stritih 2018.

⁵⁷³ FAO 2011.

⁵⁷⁴ FAO 2010.

9.3.2 Economic benefits

The following table provides an overview of the economic benefits generated by the project, and their alignment with the SDGs:

*Table 86: Summary of the economic benefits generated by the project, and their alignment with the sustainable development goals (SDGs)**

SDG	▪ Examples of relevant SDG target	Example of how the project contributes to SDG
SDG 8 “Decent Work and Economic Growth” Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	<ul style="list-style-type: none"> ▪ 8.3 Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services ▪ 8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value ▪ 8.8 Protect labor rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment ▪ 8.9 By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products. 	<ul style="list-style-type: none"> ▪ Creation of at least 867 jobs⁵⁷⁵ in the forestry sector during the project life cycle for restoration, tending, harvesting, transportation and road building and maintaining activities in the project target regions. ▪ Increased emphasis on occupational health and safety, through required trainings, standard operating procedures, and manuals.⁵⁷⁶ Vocational education and training provided will further strengthen this emphasis, along with the new forest code’s provision that all foresters and forest workers must hold formal qualifications by 2025. ▪ SFM will result in improved management of forest resources, resulting in improved economic gains from SFM in the long-term which can be reinvested in the forest sector in the future (see Chapter 8 for more detailed information from the financial and economic assessment). ▪ This includes improvement of state revenues from timber and non-timber forest resources through the new NFA

⁵⁷⁵ 650 at NFA + ca. 217 at service contractors.

⁵⁷⁶ Fuelwood production is currently carried out by unqualified people lacking appropriate technical equipment and safety measures. This regularly causes fatal accidents (CENN 2016). International best practices, such as those highlighted in the FAO SFM Toolbox on Occupational Health and Safety in Forestry: <http://www.fao.org/sustainable-forest-management/toolbox/modules/occupational-health-and-safety-in-forestry/basic-knowledge/en/>.

SDG	Examples of relevant SDG target	Example of how the project contributes to SDG
SDG 12 “Responsible Consumption and Production” Ensure sustainable consumption and production patterns	<ul style="list-style-type: none"> 12.2 By 2030, achieve the sustainable management and efficient use of natural resources 	<p>controlled mechanism, increased carbon stocks/ forest restoration, and improved forest supervision that tackle illegal activities and informality within the sector.</p> <ul style="list-style-type: none"> Development of USB sector will also create new employment opportunities, in particular in rural areas: currently 3 existing briquette factories employ about 50 people. With anticipated 8-fold market growth for USB products a comparable increase in sector work force should take place Improved sorting will ensure that higher quality wood is marketed for higher prices, instead of being used as fuel-wood (as commonly occurs under the existing system). Improved quality of forest resources, through low-impact harvesting and improved silviculture practices (e.g. tending and thinning), can lead to more opportunities to add value to Georgian timber, e.g. within the Georgian furniture industry.⁵⁷⁷ Implementation of sustainable forest management enables the maintenance of healthy ecosystems and their biodiversity, which is crucial for eco-tourism and other recreational opportunities.⁵⁷⁸
SDG 15 “Life on Land” Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	<ul style="list-style-type: none"> 15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally 15.A Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems 	

**Other relevant SDGs include poverty, energy, and sustainable consumption, all of which have economic benefits, in addition to social and environmental benefits. They are discussed in further detail in the chapters on environmental and social benefits.*

⁵⁷⁷ Garforth et al. 2016.

⁵⁷⁸ USAID 2017.

9.3.3 Social benefits

Because of the broad scope the project has also potential to deliver social benefits to the project regions. Among the intended objections, numerous Sustainable Development Goals (SDGs) can be addressed in parallel, as described in the following Table.

*Table 87: Summary of the social benefits generated by the project, and their alignment with the sustainable development goals (SDGs)**

SDG	Example of relevant SDG target	Example of how the project contributes to SDG
SDG 1 “No Poverty” End poverty in all its forms everywhere	<ul style="list-style-type: none"> ▪ 1.2 By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions ▪ 1.4 Ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services ▪ 1.5 By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters 	<ul style="list-style-type: none"> ▪ Provision of long-term benefits for communities in economically disadvantaged rural regions. Sustainable forest management ensures long-term energy security, and sustainable sourcing of fuelwood and timber that can contribute to economic development, as well as meeting household needs for wood and non-timber forest resources. Such benefits are particularly important for communities in high mountainous regions, ensuring the equal social development and well-being of people living in mountainous regions. ▪ Reduction in energy costs (ca. 40-50% reduction in energy bill) in the long-term due to supported investments in energy efficient technologies. This will improve housing conditions, too and give people access to appropriate new technology. ▪ Integration of informal work into the formal economy (e.g. informal fuelwood harvesters can receive formal employment through NFA [permanent, or seasonal positions], and/ or private sector positions).⁵⁷⁹ ▪ Improvement of living conditions in rural areas and increases in asset values of housing. Installed stoves and insulation materials induce

⁵⁷⁹ The explanatory note on the new (draft) forest code emphasizes the possibilities for integrating laborers into the formal economy, stating: “It will be possible to offer actual job opportunities to the individuals currently informally employed in wood (firewood) logging, and to increase their awareness in sustainable harvesting practices and putting their activities into legal frameworks.” – New (draft) forest code, version submitted to parliament in February 2019, p.87.

SDG	Example of relevant SDG target	Example of how the project contributes to SDG
		higher room temperatures, more heated square meters, and better air quality in households. ⁵⁸⁰ The resulting good housing conditions are important for achievements in other dimensions, such as education, health and social relations. ⁵⁸¹
SDG 3 “Good Health and Well-being” Ensure healthy lives and promote well-being for all at all ages	<ul style="list-style-type: none"> 3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination. 	<ul style="list-style-type: none"> Reduced human health impacts⁵⁸² from fuelwood burning/ air pollution, especially from particulate matter, due to the adoption of energy efficient technologies and alternative fuels (30,370 households).⁵⁸³ Women and children will particularly benefit from such measures because they usually spend more of their time at home.⁵⁸⁴ SFM may lead to additional physical and mental health benefits, where people can access ‘restorative environments’ to relax.⁵⁸⁵ Forests can also provide diverse recreational activities, supporting improvements in physical fitness of the population.⁵⁸⁶
SDG 4 “Quality Education” Ensure inclusive and equitable quality education and promote	<ul style="list-style-type: none"> 4.2 By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they 	<ul style="list-style-type: none"> Provision of long-term benefits for communities in economically disadvantaged rural regions. Sustainable forest management ensures long-

⁵⁸⁰ CSS 2012.

⁵⁸¹ Gassmann et al., 2013.

⁵⁸² Combustion for energy production in households causes particulate matter (PM) emissions. PM10 and PM2.5 consist of inhalable particles that are small enough to penetrate the thoracic region of the respiratory system. The health effects occur due to exposure over both the short term (hours, days) and long term (months, years) and include (WHO, 2013): respiratory and cardiovascular morbidity, such as aggravation of asthma, and mortality from cardiovascular and respiratory diseases and from lung cancer.

Worldwide, indoor air pollution from using combustible fuels for household energy caused 4.3 million deaths in 2012, with women and girls accounting for 6 out of every 10 of these (UN Women, 2017). In Georgia, almost 90% of rural households use biomass for cooking and heating, which therefore are exposed to indoor air pollution (WHO, 2016). 3,091 people in Georgia died due to household air pollution in 2016, adding up to a death rate from indoor air pollution of 62% per 100,000 people (IHME, 2017).

⁵⁸³ WHO estimates that in Central and Eastern Europe, for example, wood combustion accounts for 20–30% of local heating-season ambient PM_{2.5} levels in particular in rural areas where wood combustion is the only major wintertime source of particulate air pollution. While in Georgia there is no ongoing permanent monitoring of PM fractions, the data from two existing PM monitoring stations are alarming: the amount of particle emission in the air often exceeds the norms for 2-3 times. It should be mentioned, Georgia uses the EU norms, as Pm_{2.5} - 25 µg/m³, which is higher than the recommendations set by WHO standards. Gassmann et al. 2013.

⁵⁸⁴ Schmall 2015.

⁵⁸⁵ Hansmann et al. 2007; Mitchell 2013; FAO 2019.

⁵⁸⁶ FAO 2019.

SDG	Example of relevant SDG target	Example of how the project contributes to SDG
lifelong learning opportunities for all	are ready for primary education	<p>term energy security, and sustainable sourcing of fuelwood and timber that can contribute to economic development, as well as meeting household needs for wood and non-timber forest resources. Such benefits are particularly important for communities in high mountainous regions, ensuring the equal social development and well-being of people living in mountainous regions.</p> <ul style="list-style-type: none"> ▪ Reduction in energy costs (ca. 40-50% reduction in energy bill) in the long-term due to supported investments in energy efficient technologies. This will improve housing conditions, too and give people access to appropriate new technology. ▪ Integration of informal work into the formal economy (e.g. informal fuelwood harvesters can receive formal employment through NFA [permanent, or seasonal positions], and/ or private sector positions).⁵⁸⁷ ▪ Improvement of living conditions in rural areas and increases in asset values of housing. Installed stoves and insulation materials induce higher room temperatures, more heated square meters, and better air quality in households.⁵⁸⁸ The resulting good housing conditions are important for achievements in other dimensions, such as education, health and social relations.⁵⁸⁹

⁵⁸⁷ The explanatory note on the new (draft) forest code emphasizes the possibilities for integrating laborers into the formal economy, stating: "It will be possible to offer actual job opportunities to the individuals currently informally employed in wood (firewood) logging, and to increase their awareness in sustainable harvesting practices and putting their activities into legal frameworks." – New (draft) forest code, version submitted to parliament in February 2019, p.87.

⁵⁸⁸ CSS 2012.

⁵⁸⁹ Gassmann et al., 2013.

SDG	Example of relevant SDG target	Example of how the project contributes to SDG
SDG 5 “Gender Equality” Achieve gender equality and empower all women and girls	<ul style="list-style-type: none"> ▪ 5.4 Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate ▪ 5.5 Ensure women’s full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life 	<ul style="list-style-type: none"> ▪ Reduced human health impacts⁵⁹⁰ from fuelwood burning/ air pollution, especially from particulate matter, due to the adoption of energy efficient technologies and alternative fuels (30,370 households).⁵⁹¹ Women and children will particularly benefit from such measures because they usually spend more of their time at home.⁵⁹² ▪ SFM may lead to additional physical and mental health benefits, where people can access ‘restorative environments’ to relax.⁵⁹³ Forests can also provide diverse recreational activities, supporting improvements in physical fitness of the population.⁵⁹⁴
SDG 16 “Peace, Justice and Strong Institutions” Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	<ul style="list-style-type: none"> ▪ 16.7 Ensure responsive, inclusive, participatory and representative decision-making at all levels 	<ul style="list-style-type: none"> ▪ Strengthening of participation of local communities during the forest management plan development and implementation (linked with the new forest code, and promoted through the project). Additional targeted support to be provided to local communities to understand their rights, and new opportunities associated with the new forest code, and to strengthen their negotiation capacities. ▪ Improvements in the awareness of diverse stakeholders (NGOs/CSOs,

⁵⁹⁰ Combustion for energy production in households causes particulate matter (PM) emissions. PM10 and PM2.5 consist of inhalable particles that are small enough to penetrate the thoracic region of the respiratory system. The health effects occur due to exposure over both the short term (hours, days) and long term (months, years) and include (WHO, 2013): respiratory and cardiovascular morbidity, such as aggravation of asthma, and mortality from cardiovascular and respiratory diseases and from lung cancer.

Worldwide, indoor air pollution from using combustible fuels for household energy caused 4.3 million deaths in 2012, with women and girls accounting for 6 out of every 10 of these (UN Women, 2017). In Georgia, almost 90% of rural households use biomass for cooking and heating, which therefore are exposed to indoor air pollution (WHO, 2016). 3,091 people in Georgia died due to household air pollution in 2016, adding up to a death rate from indoor air pollution of 62% per 100,000 people (IHME, 2017).

⁵⁹¹ WHO estimates that in Central and Eastern Europe, for example, wood combustion accounts for 20–30% of local heating-season ambient PM_{2.5} levels in particular in rural areas where wood combustion is the only major wintertime source of particulate air pollution. While in Georgia there is no ongoing permanent monitoring of PM fractions, the data from two existing PM monitoring stations are alarming: the amount of particle emission in the air often exceeds the norms for 2–3 times. It should be mentioned, Georgia uses the EU norms, as Pm_{2.5} - 25 µg/m³, which is higher than the recommendations set by WHO standards. Gassmann et al. 2013.

⁵⁹² Schmall 2015.

⁵⁹³ Hansmann et al. 2007; Mitchell 2013; FAO 2019.

⁵⁹⁴ FAO 2019.

SDG	Example of relevant SDG target	Example of how the project contributes to SDG
		public and private sector actors, academia, local communities, etc.) at the national, regional and local level of the new forest code and sector reforms.

10 STAKEHOLDER ENGAGEMENT

10.1 Stakeholder engagement during project design

The project has been developed with continuous and active engagement from and under the strong leadership of the NDA (MoEPA). The initial project idea has been initiated by NFA, MoEPA and the GIZ IBIS project in mid- 2017. The CN received approval for submission to the GCF Secretariat in July 2018 in form of an endorsement letter. Since then the project has formed part of Georgia's GCF country programme. The Concept Note (CN) as well as the Funding Proposal (FP) were prepared under close consultation of key stakeholders in the forest and energy efficiency and alternative fuels sector. The final versions of the respective documents were presented to the NDA and the government stakeholders. The letter of no-objection for the FP was received in July 2019.

In the course of the 15-month project preparation the GIZ team met with a variety of stakeholders from government, private sector, civil society, donor organizations and beneficiaries. Several missions to the country and the project target regions were conducted to introduce and inform about the project, to obtain feedback and discuss recommendations and concerns, the environmental and social impacts, the preliminary measures proposed by the project to manage negative impacts and explore opportunities to maximize positive impacts.

In March 2018 the project team started with individual meetings with different public stakeholders of the Georgian government including NFA, MoEPA, Department of Energy Policy, Department of Supervision and others. An official kick-off workshop gathered all potential project partners to get input on the first GCF Concept Idea and a sector overview.

For private sector engagement and potential co-financing contributions, meetings were held with (M)FIs among them Crystal, Procredit Bank, TBC Bank, Finance in Motion and the Georgia Partnership Fund. Other donors were approached or themselves contacted the project team in order to discuss possible co-operations like KfW, WB, UNDP, EBRD, SIDA, FAO, SDC and EU Delegation.

Technical involvement was initiated through meetings with NGOs in the field of Energy Efficiency/Alternative Fuels to get a better market overview, to get to know the household situation and to learn about existing initiatives. Consulted were civil society organizations like the Energy Efficiency Center, CENN, REMISIA, Greens Movement of Georgia and World Experience for Georgia. A thorough analysis of the private forest sector was conducted, including interviews with private sector actors (forest service companies, concessions holders, sawmill owners etc.). The respective study can be found in Appendix 7 to the Feasibility Study.

Several meetings and public stakeholder consultations were held in the project target regions and Tbilisi to specifically discuss the environmental, social and gender impacts of the project. Meetings in eight municipalities of the target regions were held with municipality administrations and the regional NFA representatives. Focused group discussions with residents of villages took place in four villages in the Kakheti region and in three villages in the Guria region. In these consultations, 38% of the participants from the communities were women. In the course of these specific consultations 25 meetings were organized with a total of 266 participants from

different stakeholder groups such as villagers, NGOs, Government representatives and members of civil society to present and validate the project and the ESIA/ESMP and Gender analysis.

Apart from the numerous smaller validation workshops, two public workshops were held in Tbilisi to validate the final project design. The first workshop took place on April 3 and 4, 2019 with 55 participants from all relevant national government institutions, NDA, NGOs, regional and municipal governments, potential co-financing partners and the private sector. A specific workshop was held on April 23 2019 with 43 participants from various civil society organizations to discuss the questions, concerns and recommendations raised in regards to the project design.

In total around 364 men and women took part in the extensive stakeholder consultations and provided valuable feedback and comments to the project design. Related inputs and discussion results are included in the FP and strengthened the project design, which was validated and approved by government officials.

10.2 Stakeholder engagement during project implementation

For further details on the stakeholder engagement during project preparation and the stakeholder consultation and engagement plan please see Annex 7a and 7b to the Funding Proposal.

10.3 Environmental and social impact assessment

The Environmental and Social Impact Assessment (ESIA) and Environmental and Social Management Plan (ESMP) have been prepared in support of the project and are presented in Annex 6 to the Funding Proposal. The project has been screened against the International Finance Corporation (IFC) Performance Standards and the GCF and GIZ Environmental and Social Safeguards. An assessment of the environmental and social impacts of the Project was undertaken, and the Project has been considered as Medium risk (Category B); potentially rare or locally limited occurrence, largely reversible consequences, easy to manage.

The project has the potential to cause low to medium environmental and social impacts. In total, 26 impacts were identified during the assessment; 11 were identified as low, 10 were rated as medium, and the rest as negligible or could not be rated since activities included the implementation of secondary laws not yet developed. A number of mitigations measures have been proposed to manage these impacts.

The impacts include low to medium risks due to minor civil works during the construction phase and logging and maintenance of roads during the operations phase and include impacts on wildlife, risks of sedimentation and erosion, risks of hazardous spills on soils and surface water. Occupational, health and safety impacts were also identified as risks for the project workers during construction and also logging activities, in particular in the mountain slopes. Minor impacts also include increased waste and minor disturbance related to noise and dust during both construction and operations.

Social impacts are mostly due to the application of the new Forest Code through the development of the individual SFM Plans which will forbid communities from felling trees for fuelwood and timber and impose restrictions on livestock grazing and gathering of Non-Timber Forest

Products (NTPF). The main risk for communities concerns the restriction imposed on harvesting trees, due to the strong dependence of the communities to use fuelwood for cooking and heating community houses during the cold winter months and the high poverty status of rural communities. Appropriate actions are proposed to deal with these issues.

The project does not require any involuntary land acquisition and/or resettlement. It will require land for the construction of 14 BSYs. These BSYs will be constructed in land belonging to the state and or acquiring brownfield sites which have been abandoned. Access to the brownfield sites will only be undertaken through voluntary agreements. Where a voluntary agreement cannot be established, the land will not be used.

Prior to undertaking any of the project's interventions, additional stakeholder engagement will be conducted to ensure that the local population is fully consulted to ensure the project will not impact them and/or their livelihoods, culture and traditions. In addition, during the implementation of the project, participatory consultation of the SFM Plans will be one of the key activities of stakeholder engagement. Awareness raising regarding the sustainable use of forests and benefits of the forests will be carried out throughout the implementation of the project.

Capacity building of MoEPA, NFA and DES has been proposed as a tool to manage the project's impacts. This includes capacity building on a) conflict management, mediation and dispute resolution; b) communication and engagement with communities; c) occupational health and safety (a cross-cutting theme that will be integrated throughout training modules and project activities); d) environmental communication; and e) identification of critical ecosystems, fauna and flora and strengthened biodiversity awareness. The objective is to build institutional competencies for dialogue and cooperation and increase environmental communication capacities within the three institutions to build inclusive sustainable development.

Other appropriate and relevant avoidance and mitigation options have been proposed in ESMP, which will reduce the potential impacts of the project to an acceptable level (Annex 6b to the Funding Proposal).

10.4 Gender

A Gender Assessment (GA) was conducted during the project preparation process, which informed the elaboration of a Gender Action Plan (GAP) that ensures gender is effectively considered and mainstreamed throughout the project. These documents are presented in the Annexes 8a and 8b to the Funding Proposal. The process to develop these documents has been guided by the GCF Gender Policy and GCF and GIZ Gender Mainstreaming Guidelines and involved a) review of all relevant project documentation, including regulatory documentation and the standards that the project will need to abide by; b) analysis of secondary (existing documentation); c) information gathering and stakeholder consultation in Tbilisi and the three target regions and preparation of the stakeholder engagement report; and d) analysis of primary data from stakeholder engagement process.

The gender assessment identified women as being particularly vulnerable. While fuelwood is usually cut in the forest by men, further splitting of wood, carrying it home and putting it in

stoves is performed by women. So in fact, women are rather the ones who control the consumption of fuel wood and carry the burden associated with regular provision of heat supply in homes. For example, those women who already have been exposed to the use of AFs, such as briquettes refer very positively to this experience as briquettes “are easy in use and depending on the type of tree they are made of, give much warmth”. Poor households are also vulnerable as regards their ability to invest in efficient stoves, which are pricier than conventional ones. This limitation is particular prominent for women-headed households, which comprise 33% of the total in rural areas.

Based on conducted assessment, the following key recommendations were made to address the identified vulnerabilities and ensure equal participation and benefits-sharing from the project:

- Strengthening gender competencies in partner structures
- Establishing gender-responsive framework conditions
- Include women as key actors and change agents in planning and decision-making processes; e.g. by promoting women cooperatives in the supply chain of raw materials for alternative fuel production
- Improve access of women to resources (fuel, forest, money, information); e.g. through household advisory services for EE-AF solutions and financing schemes that specifically focus on vulnerable households (women-led households and single parents)
- Ensure gender mainstreaming in information campaigns, organized and led by women’s organization, to increase women’s visibility and generate knowledge within the community on the key role women play for the successful implementation of EE-AF solutions;
- Support the collection of gender-disaggregated data

As a result of stakeholder consultation and conducted analysis, the following key gender-related results of the project has been agreed upon:

- Minimum 30% of participants in the FMP and business plan development consultations are women;
- All female representatives of municipal councils and gender focal points are invited to stakeholder consultations on forest related topics
- 70% of the female-headed households in the target regions state that they have easy access to fuelwood through the new system
- 100% of policies, regulations, training materials at the knowledge management and information platform, supported by the project are gender sensitive
- The FIMS has integrated gender-disaggregated data collection options in its concept
- At least 25%⁵⁹⁵ of beneficiaries of the voucher programme are women-headed households
- 25%⁵⁹⁶ of the households visited by the technical advisers of the local information centers are female-headed.

⁵⁹⁵ The average number of women-headed households in Georgia is 39%. However, the share in urban areas is higher than in rural areas. The voucher programme targets rural areas, therefore a conservative approach is taken here.

⁵⁹⁶ The average number of women-headed households in Georgia is 39%. However, the share in urban areas is higher than in rural areas. The awareness activities target rural areas; therefore a conservative approach is taken here.

In order to ensure that the GAP is implemented and expected gender-related results are achieved, regularly monitored and evaluated, gender mainstreaming and monitoring training will be conducted for all GIZ and Project Implementation Unit staff (representatives of NFA, DES, EIEC, ARDA, GIZ) and responsibilities assigned accordingly.

11 PROJECT RISKS

The following tables provide an overview of the main technical and operational, financial and governance risks associated with the project. Avoidance and/or mitigation measures are also presented for each risk.

Table 88: Overview of project risks

Selected Risk Factor 1		
Category	Probability	Impact
Technical and operational	Medium	Medium
Description		
Forest management inventories and FMPs developed may differ from the forest model, resulting in a different prioritization of SFM measures and potentially different targets (e.g. the amount of timber that can be sustainably harvested).		
Mitigation Measure(s)		
<ul style="list-style-type: none"> The Feasibility Study emphasizes that while the forest model was developed using the best available information (existing studies, and extensive consultation with the Georgian government and other stakeholders) and using conservative estimates, all models are “simplifications of reality” and should be further informed by up-to-date forest inventories, particularly in the case of Georgia where data and information gaps in the forest sector are a major barrier facing the sector. Detailed forest management inventories conducted to inform FMPs will provide more accurate information and prioritize necessary SFM activities based on actual forest conditions. While the proposed SFM practices are not expected to drastically change, since SFM involves a broad toolbox of approaches that are aligned with the forest conditions, nonetheless some adjustments in the practices and targets may be required (e.g. areas where certain practices are implemented, annual allowable cut, etc.). Harvesting yields and annual allowable cut will be closely assessed based on FMIs and FMPs. Changes in SFM activities may also impact the revenues from SFM, however business plans will be developed based on FMPs that provide detailed financial and economic planning – ensuring revenue modeling and financial planning are based on the forest conditions and confirmed SFM activities. When necessary to change indicators/ targets, close communication will be ensured with GCF and other project partners. Information based on SFM best practices (and benchmarks) and a clear justification for any adjustments will be provided.⁵⁹⁷ 		
Selected Risk Factor 2		
Category	Probability	Impact
Technical and operational	Low	Medium
Description		
Over-commercialization of forest resources (timber and non-timber forest resources) to increase economic gains at the regional level, where forest management transitions from SFM to unsustainable forest management practices focusing on the over-exploitation of timber and fuelwood.		
Mitigation Measure(s)		
<ul style="list-style-type: none"> Forest Management Inventories to be conducted as part of the FMP development process, based on best practices. FMPs will be directly linked to FMIs, and revised by MoEPA. Trainings will be 		

⁵⁹⁷ The main assumptions for the forest model are provided in the Feasibility Study Chapter 5.2.3.4.

provided to MoEPA on key considerations for the revision process in the context of SFM, and additional trainings will be provided to NFA for conducting forest management inventories, developing FMPs based on inventories and stakeholder consultations, and developing business plans for each district to improve sector planning and monitoring. This will improve transparency, and support active management. The approval of FMPs by the Ministry will also ensure checks and balances are in place.

- The operation of BSYs will be closely linked with the FIMS and electronic system for timber resource management to ensure that timber entering and leaving BSYs are transparently monitored and tracked, ensuring a clear chain of custody. It will improve transparency in the sector as wood will be registered and sorted only at BSYs, reducing illegality within value chains.
- Financial auditing of BSYs will be conducted by the NFA and the State Audit Office of Georgia on a regular basis, ensuring alignment with approved FMPs and annual plans
- Trainings will be conducted for national, regional, and district NFA staff on BSYs, fuelwood provision and sustainable forest management to build capacities on SFM, and emphasize the need for forest management based on revised regulations (informed by national and management-level C&I for SFM)
- The new (draft) Forest Code, and associated regulatory changes (e.g. Activity 1.4) will further ensure that there is a strong regulatory foundation for SFM
- Support to DES in Activity 1.2 will further support risk mitigation, as they will be able to supervise forest use in a more efficient and effective manner. The ongoing transfer of supervision responsibilities from NFA to DES will also support improved transparency, and accountability of NFA – ensuring forest management activities are sustainable and based on approved FMPs.

Selected Risk Factor 3

Category	Probability	Impact
Governance	Low	High
Description		
While efforts to reduce corruption in the forest sector have been successful, there is still a risk that corruption could persist.		
Mitigation Measure(s)		
<ul style="list-style-type: none"> ▪ The country's anti-corruption strategy has been strengthened within the sector under the National Forest Concept and ongoing reforms in recent years. For example, currently there is a regular change of patrol districts, their patrolling areas are not known to them in advance of their shift. In addition, systems that were prone to corruption, namely the timber concession system, are being phased out, and more transparent systems promoted. ▪ The project will also strengthen Georgia's anti-corruption strategy through improving transparent monitoring of forest use through the procurement of key technology to improve supervision (e.g. cameras on forest roads), the strengthening of standard operational procedures and protocols, strengthening the training system, and implementing diverse trainings for patrols and inspection staff (ensuring staff are aware of best practices and protocols). A major contribution to reducing corruption in the sector will be the development and operationalization of FIMS, including the Electronic System of Timber Resources Management, among other modules, that make the entire sector more transparent (Activity 1.5 – Monitoring and MRV). ▪ FMPs developed by NFA will be revised and approved by MoEPA, ensuring a system of checks and balances within the government. 		

Selected Risk Factor 4

Category	Probability	Impact
Technical and operational	High	Low

Description		
Staff turnover may result in loss of knowledge, information and capacities.		
Mitigation Measure(s)		
<ul style="list-style-type: none"> Development of SOPs and secondary legal acts, and standardized training modules for onboarding of new staff members that ensure the consistent application of standard practices by new staff members, standardized basic training, and improved knowledge management. Pool of trainers within institutions will train additional trainers, and capacities will be built within institutions to ensure trainings are not only “one-off” trainings, but instead institutionalized that can be repeated, and scaled up to other districts/ regions in the country. Training modules will be integrated in the online platform (incl. e-courses, videos from in-person trainings, course materials, etc.). The project will strengthen Vocational Education and Training in the sector, where new and existing laborers in the sector can receive formal education qualifications based on best-practices and knowledge for SFM. Ongoing trainings, engaging diverse staff from national, regional, district and local level. 		
Selected Risk Factor 5		
Category	Probability	Impact
Technical and operational	Medium	Medium
Description		
Limited opportunities for local people to benefit from sustainable forest management under the new system (esp. those who previously were informally employed in the sector, or who harvested illegal fuelwood). Strengthened forest supervision and law enforcement combined with the pricing of fuelwood may negatively impact local livelihoods of vulnerable forest-dependent households.		
Mitigation Measure(s)		
<ul style="list-style-type: none"> Past use of the forest was often conducted in illegal/informal ways and based on unsustainable utilization patterns where harvesting often exceeded sustainable utilization levels. The New Forest Code and national criteria and indicators for SFM, especially the latter under the social principle, recognize the importance of engaging diverse stakeholders within the FMP planning and implementation process. Community-outreach and continued engagement is a cross-cutting element throughout the project, and is further highlighted in Chapter 10 (Stakeholder engagement). Local communities will be provided support and incentives to switch to more efficient energy appliances and alternative fuel (Component 2), to reduce their reliance on fuelwood (incl. illegal cutting). The project is discussing with other donors regarding opportunities to provide ongoing technical support design and implement a Livelihood Support Program, jointly negotiated with the NFA during the FMP process, as long as the ecological condition of the forest is not compromised. The program’s goal is to provide alternative livelihood opportunities for rural communities through the following forest and energy related value chain development. Given the new opportunity for improved stakeholder consultation and engagement in the forest management planning process, the project aims to set a positive example of how such engagement could look like. For each new FMP at least three stakeholder consultations will be conducted (one each at the beginning, middle and final validation), and additional technical support provided to both NFA and local communities to ensure productive and fruitful consultations. Georgia promotes SFM, and thus this participatory process also is an important platform for local stakeholders to discuss local sustainable forest use (e.g. grazing, eco-tourism, recreation etc.). Targeted support will be provided to NFA and local communities to improve their awareness of opportunities for collaboration, and to strengthen local engagement. 		

- Awareness raising will be conducted at various levels, and engaging diverse actors within Activity 2.3 – acknowledging the importance of a combined communications and awareness raising for forest sector reforms and alternative energy and energy efficiency. NGOs, local municipalities and community liaisons will play an important role in awareness raising and local capacity building.
- The new structure of the forest management will result in additional jobs for local people to support with management activities, including within NFA and in private businesses (permanent and seasonal staff). To the greatest extent possible the project will support the hiring of local people (through awareness raising campaigns, targeted local recruitment), facilitating formal job creation in the region.⁵⁹⁸ This will help transform jobs from the informal to formal sector, providing more social security and stability.
- Currently the NFA plans to maintain prices currently paid by households, through formal networks, to facilitate the smooth transition to the new mechanism. However, some households receive additional subsidies (incl. poor households receiving municipal subsidies, others who go to the forest themselves), and it will be challenging for these households to pay GEL 81/m³.

Selected Risk Factor 6

Category	Probability	Impact
Technical and operational	Low	Medium
Description		
The approval of policies and regulations is linked to political processes within the country, over which the project has no control. Thus, there is a risk that policies, secondary legal acts, forest management plans and annual plans supported by the project are not formally approved/ adopted. Delays in approval of the forest code, FMPs, and key regulations may also impact the project.		
Mitigation Measure(s)		
<ul style="list-style-type: none"> ▪ Specific measures to address this risk are limited given that this process (for Laws and regulations) is embedded within Parliament, and is thus out of the project's control. ▪ Close collaboration and dialogue with key actors have been ensured in project development/design and will be maintained during project implementation. In terms of the forest code, in February 2019 it was accepted to the next session of Parliament and a speaker assigned, demonstrating a positive stride towards its timely approval. Strong ownership of the Government has been ensured throughout project development and will be maintained throughout project implementation through close coordination and cooperation. Thus, they are informed based on up-to-date information and partners are aware of its relevance for the project. For policies related to EE/AF this includes close collaboration and dialogue with EU and Energy community, as well as other stakeholder promoting EU integration agenda. For other forestry-related measures, this includes close coordination and cooperation with MoEPA and NFA, as well as other forest sector stakeholders, including local communities who will be consulted through the project on the proposed regulatory changes (e.g. regulations for the commercial use of non-timber forest resources). ▪ Delays could also impact the project, and while they are not ideal, a phased-approach is applied where the project already anticipates high-priority actions as soon as the project starts (e.g. enabling environment, elaboration of key secondary legal acts). The project will also support FMPs in various stages, including some which will be approved or will be nearly approved by project start. If there are delays in the elaboration, adjustment and/or approval of some FMPs, work on others can be continued. NFA has its' own inventory team, which has been building its' capacities through the implementation of NFI and FMIs, with the support from donors such as GIZ. Thus, the team is able to start relatively quickly given their experiences in implementing inventories based on best practices in the country. 		

⁵⁹⁸ Draft Forest Code, Version submitted to Georgian Parliament in February 2019.

<ul style="list-style-type: none"> Outside of the project, GIZ has already committed to support the Government of Georgia with the revision of the current Regulations 179, 241 and 242 prior to project start, to ensure their timely revision. 		
Selected Risk Factor 7		
Category	Probability	Impact
Technical and operational	Medium	Medium
Description		
On-the-ground advocacy work is delayed due to ineffective implementation structure, insufficient capacities to engage effectively with households at the local/community level and lack of coordination with project's financial partners and EE-AF suppliers (Activity 2.3)		
Mitigation Measure(s)		
<ul style="list-style-type: none"> Selection of Local Partner/EE for Activity 2.3 will be based on assessment of local capacities and existence of established implementation structure and operational capacities in the target regions. Consequently, the risk of operational delay to occur will be lower. Full time Communication Specialist/Task leader will be recruited by GIZ to ensure coordination between sub-contractors and partners, including EE-AF suppliers, and financing partners Communication task force will be established comprising representatives of TAISF (Activity 2.1), Financing partners (Activity 2.2) and sub-contractors to be engaged under Activity 2.3 		
Selected Risk Factor 8		
Category	Probability	Impact
Technical and operational	Low	Medium
Description		
Investment in EE-AF sector growth do not materialize in spite of TAISF support.		
Mitigation Measure(s)		
<ul style="list-style-type: none"> Maintaining comprehensive data-base of suppliers and establishing regular and direct lines of communication/marketing Undertaking regular surveys and capacity gaps assessment to tailor TAISF offerings to sector's need and emerging opportunities Liaising with ARDA Partner Banks to identify bottlenecks and barriers faced by EE-AF suppliers in obtaining loans/meetings banks criteria Market research and dissemination of market intelligence about specific EE-AF business opportunities in Georgia and abroad among Georgian business and financing community (e.g. start-up fora, investment conferences, etc.) 		
Selected Risk Factor 9		
Category	Probability	Impact
Other	Medium	Medium
Description		
Insufficient uptake of EE stoves despite offered discount.		
Mitigation Measure(s)		
<ul style="list-style-type: none"> Annual review of the Program implementation to monitor performance/sales of EE-AF along with household survey to better understand preferences and barriers 		

<ul style="list-style-type: none"> Local marketing campaign and activities of Local Information Points (under Activity 2.4) and BSYS under Activity 1.3 Regular market survey/studies by partner FIs/MFIs to offer better tailored products to the need/profile of the targeted HHs 		
Selected Risk Factor 10		
Category	Probability	Impact
Technical and operational	Medium	Medium
Description		
Delay with adoption of EE policy package, including establishment of EE Agency and other relevant provisions of EU Energy acquis.		
Mitigation Measure(s)		
<ul style="list-style-type: none"> Close collaboration and dialogue with EU and Energy Community, as well as other stakeholders promoting EU integration agenda Ministry of Economy and Sustainable Development will act as the main beneficiary and counterpart for this Activity and will take the lead role in advising the project on risk mitigation measures 		

REFERENCES

- Agricultural University of Georgia. n.d. Assessment of carbon stocks in the forests of Georgia. Agricultural University.
- Akhalkatsi, M. 2015. Forest Habitat Restoration in Georgia, Caucasus Ecoregion. Tbilisi, Georgia.
- APA, Agency of Protected Areas. No date. Protected area sites of Georgia. Available [online](#).
- Bertelsmann Stiftung. 2019. BTI 2018, Georgia Country Report. Available [online](#).
- CENN, Caucasus Environmental NGO Network. 2016. Cost-Benefit Analysis Fuelwood vs. Alternative Heating Resources. Tbilisi, Georgia.
- Chazdon, R. 2016- When is a forest a forest? Forest concepts and definitions in the era of forest and landscape restoration. *Ambio*, 45(5): 538-550.
- Chiburidanidze. 2017. Overview of Forests and Forest Sector of Georgia. Tbilisi: Forest Policy Division, National Forestry Agency.
- Chrystal Micro-Finance Organization. 2018. The project “Production of solid biofuel briquette from forest waste”.
- Deloitte Consulting LLP 2014. Household Energy End-Use Survey. Final Report under USAID Hydro Power and Energy Planning Project.
- DES. 2018. Strengthening Capacity of the Department of Environmental Supervision for the Improvement of Forest Control. [Presentation], Tbilisi, Georgia.
- EIEC, Environmental Information and Education Centre. 2019. EIEC Website. Available [online](#).
- Elizbarashvili, M., Elizbarashvili, E., Tatishvili, M., Elizbarashvili, S., Meskhia, R., Kutaladze, N., Khardziani, T. 2017. Georgian climate change under global warming conditions. *Annals of Agrarian Science*, 15(1): 17–25.
- ENPI EAST FLEG II. 2014. Forest Dependency in Rural Georgia, (October), 1–49.
- ENPI EAST FLEG II. 2015. Recommendations for developing Forest Education Strategy for Georgia. FLEG II (ENPI East).
- FAO. 2010. Managing forests for climate change. Available [online](#).
- FAO. 2011. Assessing forest degradation: Towards the development of globally applicable guidelines. *Forest Resources Assessment Working Paper 177*. FAO.
- FAO. 2011. Forests and landslides. Bangkok, Thailand.
- FAO. 2014. Global Forest Resources Assessment 2015, Country Report. Georgia. Available [online](#).
- FAO. 2015. Woodfuel Handbook. Available [online](#).
- FAO. 2019. Sustainable Forest Management Toolbox Available [online](#).
- Garforth, M., Nilsson, S., Torchinava, P. 2016. Wood market study. Integrated Biodiversity Management, South Caucas (IBiS) Program. GIZ, Tbilisi, Georgia.
- Gassmann, F., Berulava, G., T’ok’mazišvili, M. 2013. Economic and Social Vulnerability in Georgia. UNDP. Tbilisi, Georgia.

GEO, UNDP, and SDC. 2018. Comparative analysis of climate change adaptation and disaster risk reduction architecture and recommended actions: road map. Georgia's Environmental Outlook (GEO), the United Nations Development Programme (UNDP), and Swiss Agency for Development and Cooperation (SDC).

Georgian National Investment Agency. No Date. Invest in Georgia. Available [online](#).

GEOSTAT. 2015. Georgia Energy Balance.

GEOSTAT. 2016. 2014 General Population Census Main Results. Available [online](#).

GEOSTAT. 2017. Energy consumption in households.

GEOSTAT. 2018. Women and Men in Georgia. Available [online](#).

GEOSTAT. 2019a. Living conditions. Available [online](#).

GEOSTAT. 2019b. Employment and unemployment. Available [online](#).

GEOSTAT. 2019c. Regional Environmental Statistics. Available [online](#).

GEOSTAT. 2019d. Population by regions and self-governed units. Available [online](#).

GEOSTAT. 2019e. Forests. Available [online](#).

GEOSTAT. 2019e. GDP and other Indicators of National Accounts. Available [online](#):

GEOSTAT. 2019f. Employment and Unemployment. Available [online](#).

GERES. 2016. How to build an energy efficient house? A practical guide for rural masters. Available [online](#).

GIZ, EURAC, and UNU-EHS. 2018. Climate Risk Assessment for Ecosystem-based Adaptation - A guidebook for planners and practitioners. GIZ, Bonn, Germany.

GIZ. 2013. Kakheti Regional Development Strategy: 2014-2021. Tbilisi.

GIZ. 2015. Energy Demand Assessment Dedoplistskaro and Akhmeta. Tbilisi, Georgia.

Global Forest Watch. "Tree Cover Loss in Georgia". Accessed on 09.04.2019 from www.global-forestwatch.org.

Gorgiladze, L., Meparishvili, G., Sikharulidze, Z., Natsarishvili, K., Davitadze, R. 2011. First report of box blight caused by *Cylindrocladium buxicola* in Georgia. New Disease Reports, 23: 24.

Government of Georgia. 1996a. Law of Georgia on the System of Protected Areas. Available [online](#).

Government of Georgia. 1996b. Law of Georgia on Environmental Protection. Available [online](#):

Government of Georgia. 2011. Law of Georgia on the Management of Forest Fund. Law of Georgia No. 4419 (approved March 11, 2011). Available [online](#):

Government of Georgia. 2014a. Socio-economic Development Strategy of Georgia 2020 (2014-2020). Available [online](#).

Government of Georgia. 2014b. Georgian Law on Waste Management Code. Available [online](#).

Government of Georgia. 2014c. Biodiversity Strategy and Action Plan for Georgia 2014-2020. NBSAP.

Government of Georgia. 2015. Georgia's Intended Nationally Determined Contribution Submission to the UNFCCC. Tbilisi, Georgia.

Government of Georgia. 2017a. Rural Development Strategy of Georgia 2017-2020. Available [online](#).

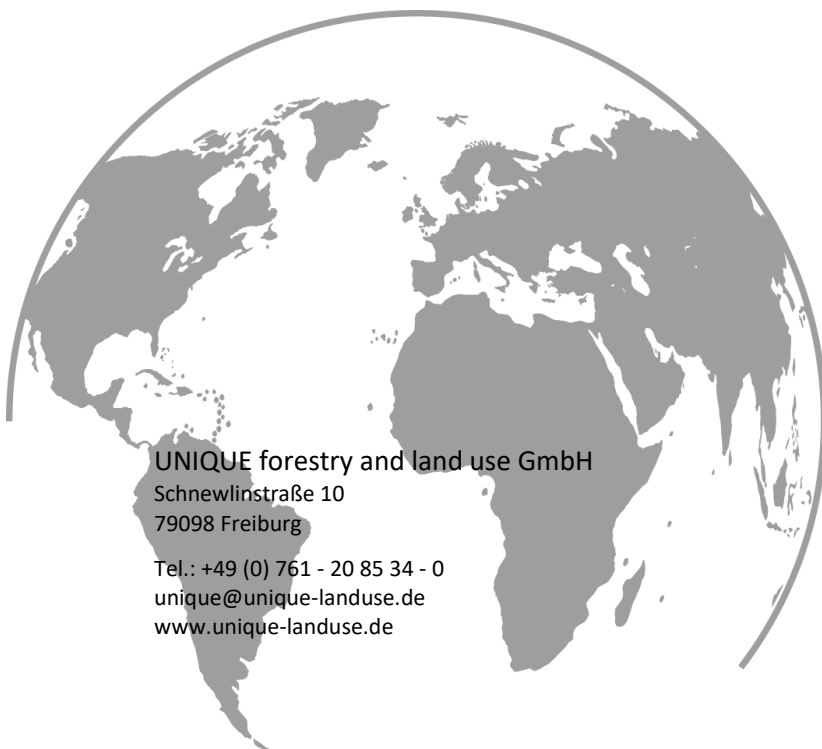
- Government of Georgia. 2017b. Law of Georgia on Environmental Impact Permits. Available [online](#).
- Government of Georgia. 2017c. Environmental Assessment Code [DRAFT]. Available online: <https://matsne.gov.ge/en/document/download/3691981/1/en/pdf>
- Government of Georgia. 2018. Regional Development Programme of Georgia 2018-2021. Available [online](#).
- Green Alternative. 2016. Forestland Governance in Georgia: Assessment of Legislation and Practice. Tbilisi: Green Alternative.
- Green Movement of Georgia/Friend of the Earth Georgia and Eco-vision. 2015. Identification of options to improve energy efficiency situation in Dedoplistskaro municipality. Report commissioned under GIZ project Sustainable Management of Biodiversity in South Caucasus.
- Hansmann, R., Hug, S.M., Seeland, K. 2007. Restoration and stress relief through physical activities in forests and parks. *Urban Forestry and Urban Greening*, 6(4): 213-225.
- Helbig. 2016. Energy demand assessment in the municipalities of Dedoplistskaro and Akhmeta. Report commissioned under GIZ project “Integrated Biodiversity Management in South Caucasus”
- Huhtinen, M. 2006. Wood biomass as a fuel. 5EURES Training Sessions, Supported by the EU Commission under the Intelligent Energy-Europe Program. Available [online](#).
- IEA World Energy Balances. 2018. World Energy Balances. Available [online](#).
- IMF, International Monetary Fund. 2018a. Georgia. IMF Country Report No. 18/198. Available [online](#).
- IMF. 2018b. Georgia and the IMF. Available [online](#).
- ITTO, International Timber Trade Organization. 2019. Reduced Impact Logging. Available [online](#).
- Keggenhoff, I., Elizbarashvili, M., King, L. 2015. Recent changes in Georgia’s temperature means and extremes: Annual and seasonal trends between 1961 and 2010. *Weather and Climate Extremes*, 8: 3445.
- Kobakhidze, N. 2015. Impact analyses on status of biodiversity in Armenia, Azerbaijan and Georgia, and at regional level (South Caucasus). IBIS Program, GIZ, Tbilisi, Georgia.
- Lazashvili. 2012. Energy and Economic Reasoning of Large-scale Implementation of Energy Efficient Living Stoves.
- Lekveishvili, G. 2019. Data on household energy consumption in small urban & rural settlements of Georgia. Available [online](#).
- Matcharashvili, I. 2012. Problems and Challenges of Forest Governance in Georgia. Association Green Alternative, Tbilisi, Georgia.
- Matsiakh, I. 2016. Assessment of Forest Pests and Diseases in Native Boxwood Forests of Georgia. Available [online](#).
- Ministry of Agriculture of Georgia. 2015. Strategy for Agricultural Development in Georgia 2015-2020. Available [online](#).
- Ministry of Environment Protection of Georgia. 2011. National Report on the State of Environment in Georgia (2007-2009).

- Ministry of Environment Protection of Georgia. 2012. National environmental action programme of Georgia: 2012-2016. Tbilisi, Georgia.
- Mirzashvili, V., Kufaradze, G. 1955. Georgian Forest Taxation Guideline
- Mitchell, R. 2013. Is physical activity in natural environments better for mental health than physical activity in other environments? *Social Science & Medicine*, 91: 130-134.
- MoENRP and NFA, Ministry of Environment and Natural Resources Protection and the National Forestry Agency. 2014. National Forest Concept for Georgia. Tbilisi, Georgia.
- MoENRP, Ministry of Environment Protection of Georgia. 2014a. Second National Action Program to Combat Desertification. Tbilisi, Georgia.
- MoENRP. 2014b. National Biodiversity Strategy and Action Plan of Georgia 2014-2020. Tbilisi, Georgia.
- MoENRP. 2015. Georgia's Third National Communication to the UNFCCC. Tbilisi, Georgia.
- MoENRP. 2016a. First Biennial Update Report on Climate Change. Tbilisi, Georgia.
- MoENRP. 2016b. Forest Education Strategy and Action Plan. Tbilisi, Georgia.
- MoEPA, Ministry of Environmental Protection. 2011. National Report on the State of the Environment of Georgia (2007-2009). Tbilisi: Ministry of Environment Protection of Georgia.
- MoEPA. 2018. Development of Emerald Network in Georgia. Presentation. Available [online](#).
- MoEPA. 2018. Third National Environmental Action Programme of Georgia 2017-2021. Available [online](#).
- Morciladze, L., Bularga, A. 2005. Measuring and improving the performance of environmental enforcement in Georgia. OECD, Tbilisi, Georgia.
- Nakaidze, E. ., Vachnadze, G. S., Tiginashvili, Z. T., Tsereteli, G. V, & Gigauri, D. G. 2012. Determining carbon stock in forest stands of Caucasian Pine and Oriental Spruce in Georgia. *Annals of Agrarian Science*, 147(9).
- National Bank of Georgia. 2018. Monetary Policy Report, February. Available [online](#).
- NFA. 2019. Comparative analysis of activities carried out by National Forestry Agency 2015-2018. [Unpublished presentation]. Tbilisi, Georgia.
- Patarkalashvili, T. 2016. Some problems of forest management of Georgia. *Annals of Agrarian Science*, 14: 108-113.
- ÖBF. 2015. Carbon Baseline for Borjomi-Bakuriani Forestry District. Progress Report 4, Annex 7. Project Report.
- Olofsson, P., Torchinava, P., Woodcock, C.E., Baccini, A., Houghton, R.A., Ozdogan, M., Zhao, F., Yang, X. 2010. Implications of land use change on the national terrestrial carbon budget of Georgia. *Carbon Balance and Management*, 5(4): 1-13.
- Patarkalashvili, T. 2016. Some problems of forest management of Georgia. *Annals of Agrarian Sciences*, 14(2), 108–113. Available [online](#).
- Raaflaub, M., Dobry, L. 2015. Pasture Management in Georgia: Current situation, frame conditions, potentials of development.
- Ramsar Convention. 2014. Georgia. Available [online](#).
- Rukhadze, A., Vachiberidze, I., Fandoeva, M. 2014. National Climate Vulnerability Assessment: Georgia. Climate Forum East (CFE) and Georgia National Network on Climate Change.

- Schmall, S. 2015. Gender Analysis for the GIZ Programme “Integrated Biodiversity Management in the South Caucasus (IBiS)”. Tbilisi, Georgia.
- State Audit Office. 2016a. Social Utilization of Forest Wood Resources. Tbilisi, Georgia.
- State Audit Office. 2016b. Performance Audit of Forest Commercial Resource Management. Tbilisi, Georgia.
- Surtevant, B.R. Fall, A., Kneeshaw, D.D., Simon, N.P.P., Papaik, M.J., Berninger, K., Doyon, F., Morgan, D.G., Messier, C. 2007. A Toolkit Modeling Approach for Sustainable Forest Management Planning: Achieving Balance between Science and Local Needs. *Ecology and Society*, 12(2): 7.
- The Greens Movement of Georgia 2015. Sustainable Management of Biodiversity, South Caucasus, Identification of Options to Improve Energy Situation in Dedoplistskaro Municipality.
- Torchinava, P. 2017. Introduction of 1st Georgian NFI. Available [online](#).
- Tritih, J., Stritih, A. 2018. Adjara Forest Climate Adaptation Strategy. Tbilisi, Georgia.
- Umwelt Bundesamt. 2018. Implementation of Nationally Determined Contributions: Georgia Country Report.
- UNDP Georgia. 2014. Climate Change and Agriculture in Kakheti. Tbilisi, Georgia
- UNDP, United Nations Development Program & MoENRP, Ministry of Environment and Natural Resources 2009. Georgia’s Second National Communication to the UNFCCC.
- UNDP, United Nations Development Program. 2019. Georgia, Human Development Indicators. Available [online](#).
- UNDP. N.D. UNDP Project: “Expansion and Improved Management Effectiveness of Adjara Regions Protected Areas.” Report for “Implementation of the Action Plan for Undertaking Field Testing of Selected Technical Solutions in Machakhela National Park Support Zone villages”.
- UNECE. 2017. National Principles, Criteria and Indicators for Sustainable Forest Management. Tbilisi, Georgia.
- Urudshadze, T.F., Ghambashidze, G.O. 2013. Soils of Georgia. In: Yigini, Y., Panagos, P., Montanarella, L. 2013. Soil Resources of Mediterranean and Caucasus Countries: Extension of the European Soil Database. European Commission Joint Research Centre Institute for Environment and Sustainability. Ispra, Italy: pp. 78-96.
- Urushadze, T., Nakaidze, E., Vachnadze, G., & Tiginashvili, Z. 2011. Carbon stocks in the main Georgian forest formations, 37–40.
- USAID and Winrock. 2017. Enhancing capacity for low emission development strategies (EC-LEDS) clean energy program: Georgia’s low emission development strategy. Tbilisi, Georgia.
- USAID. 2016. The Georgian Road Map on Climate Change Adaptation. Tbilisi, Georgia.
- USAID. 2017. Climate Risk Profile Georgia. Tbilisi, Georgia.
- Vachnadze, G. S., Tiginashvili, Z. T., Tsereteli, G. V., Aptsiauri, B. N., & Nishnianidze, Q. G. 2016. Carbon stock sequestered from the atmosphere by coniferous forests of Eastern Georgia in conditions of global warming. *Annals of Agrarian Science*, 14(2), 127–132. <https://doi.org/10.1016/j.aasci.2016.05.014>

- Vachnadze, G. S., Tiginashvili, Z. T., Tsereteli, G. V., Aptsiauri, B. N., & Nishnianidze, Q. G. (2016). Carbon stock sequestered from the atmosphere by coniferous forests in Svaneti. *Annals of Agrarian Science*, 14(3), 269–272. <https://doi.org/10.1016/j.aasci.2016.08.013>
- Vachnadze, G. S., Tsereteli, G. V., Tiginashvili, Z. T., Aptsiauri, B. H., & Nakaidze, E. 2015. Evaluation of Organic Carbon Stock in Soils of Beech Forests of Eastern Georgia. *Annals of Agrarian Science*, 13(2), 81–88.
- WECF, Women in Europe for a Common Future. 2015.
- WEG. 2011. Design of building envelope insulation, with external appearance of the building
- Wily, L. A. 2014. Communities as forest conservators and managers in Georgia: Can it work? Sustainable Management of Biodiversity, South Caucasus. Tbilisi, Georgia.
- World Bank. 2006. Drought Management and Mitigation Assessment for Central Asia and the Caucasus. Washington D.C., USA.
- World Bank. 2013. World Development Indicators. Available [online](#).
- World Bank. 2015. Georgia. Country Environmental Analysis. Institutional, Economic and Poverty Aspects of Georgia's Road to Environmental Sustainability. Available [online](#).
- World Bank. 2018a. FY19-FY22 Country Partnership Framework for Georgia. Washington D.C., USA.
- World Bank. 2018b. Forests, Livelihoods, and Poverty Linkages in the Forest Communities of Georgia: Evidence and recommendations from a 2016 household survey. Washington D.C., USA.
- World Bank. 2019. Data, Georgia. Available [online](#).
- Zeidler, U., & Schachtschabel, G. D. 2016. Strategic environmental and social assessment of draft Forest Code of Georgia. World Bank.

APPENDICES (see separate document)



UNIQUE forestry and land use GmbH
Schnewlinstraße 10
79098 Freiburg

Tel.: +49 (0) 761 - 20 85 34 - 0
unique@unique-landuse.de
www.unique-landuse.de