Consideration of funding proposals - Addendum III
Funding proposal package for FP109

Summary

This addendum contains the following seven parts:

a) A funding proposal titled “Safeguarding rural communities and their physical and economic assets from climate induced disasters in Timor-Leste”;
b) No-objection letter issued by the national designated authority(ies) or focal point(s);
c) Environmental and social report(s) disclosure;
d) Secretariat’s assessment;
e) Independent Technical Advisory Panel’s assessment;
f) Response from the accredited entity to the independent Technical Advisory Panel’s assessment; and

g) Gender documentation.
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Gender documentation  134
The Green Climate Fund (GCF) is seeking high-quality funding proposals.

Accredited entities are expected to develop their funding proposals, in close consultation with the relevant national designated authority, with due consideration of the GCF’s Investment Framework and Results Management Framework. The funding proposals should demonstrate how the proposed projects or programmes will perform against the investment criteria and achieve part or all of the strategic impact results.

**Project/Programme Title:** Safeguarding rural communities and their physical and economic assets from climate induced disasters in Timor-Leste

**Country/Region:** Timor Leste

**Accredited Entity:** United Nations Development Programme

**Date of Submission:** 24 May 2019
Contents

Section A  PROJECT / PROGRAMME SUMMARY
Section B  FINANCING / COST INFORMATION
Section C  DETAILED PROJECT / PROGRAMME DESCRIPTION
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Section E  EXPECTED PERFORMANCE AGAINST INVESTMENT CRITERIA
Section F  APPRAISAL SUMMARY
Section G  RISK ASSESSMENT AND MANAGEMENT
Section H  RESULTS MONITORING AND REPORTING
Section I  ANNEXES

Note to accredited entities on the use of the funding proposal template

- Sections A, B, D, E and H of the funding proposal require detailed inputs from the accredited entity. For all other sections, including the Appraisal Summary in section F, accredited entities have discretion in how they wish to present the information. Accredited entities can either directly incorporate information into this proposal, or provide summary information in the proposal with cross-reference to other project documents such as project appraisal document.
- The total number of pages for the funding proposal (excluding annexes) is expected not to exceed 50.

Please submit the completed form to:

fundingproposal@gcfund.org

Please use the following name convention for the file name:

“[FP]-[Agency Short Name]-[Date]-[Serial Number]”
<table>
<thead>
<tr>
<th>A.1. Brief Project / Programme Information</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A.1.1. Project / programme title</strong></td>
<td>Safeguarding rural communities and their physical assets from climate induced disasters in Timor-Leste</td>
</tr>
<tr>
<td><strong>A.1.2. Project or programme</strong></td>
<td>Project</td>
</tr>
<tr>
<td><strong>A.1.3. Country (ies) / region</strong></td>
<td>Timor-Leste/ Asia and the Pacific</td>
</tr>
<tr>
<td><strong>A.1.5. Accredited entity</strong></td>
<td>United Nations Development Programme</td>
</tr>
<tr>
<td><strong>A.1.5.a. Access modality</strong></td>
<td>☑ International</td>
</tr>
</tbody>
</table>
| **A.1.6. Executing entity / beneficiary** | Executing Entity: Ministry of Commerce, Industry and Environment (General Directorate for Environment)  
Beneficiary: Approximately 175,840 direct beneficiaries in the 6 target municipalities (15% of total population).  
Beneficiary institutions: Ministry of State Administration (MSA); Ministry of Agriculture and Fisheries (MAF) and Ministry of Commerce, Industry and Environment (MCIE); Ministry of Public Work, Transport and Communication (MoPTC); Ministry of Social Solidarity (MSS) and Sub-National Authority (Baucau, Ermera, Aileu, Viqueque, Lautem and Liquica Municipalities).  
Averted economic losses equivalent to 11.5% of GDP; Introduction of new knowledge and skills including design, construction and maintenance (for at least 1,500 engineers and practitioners nationally) in climate proofing of small-scale rural infrastructure, essential for local resilience. Training and upskilling of 1,500 practitioners, engineers, contractors in climate proofing of infrastructure;  
130 climate proofed small-scale rural infrastructure units (47 Road slope stabilization projects (216.94 km); 38 Water Supply Systems; 25 Irrigation systems (54.18km); 20 flood defenses (14.15 km)) for a total value $25.68 Million USD which includes $12.5 Million co-financing from MSA, resulting in increased access of rural communities to essential services such as education, health services and access to market, and reduced exposure to climate-induced hazards;  
Environmental Co-benefits: 300 ha of degraded land rehabilitated and protected from erosion, landside and flood risk from climate variability and change, benefitting infrastructure and improving livelihoods, by agroforestry (100 has reforested state lands, 100 ha agroforestry on state lands, and 100 ha of agroforestry on farmland). 23,412 households with improved and climate resilient livelihoods through implementation of agroforestry. A further 1200ha of reforestation and agroforestry from MAF co-financing. |
| **A.1.5.a. Access modality**            | ☐ Micro (≤10) ☐ Small (10<x≤50) |
A.1.7. Project size category (Total investment, million USD)

☒ Medium (50<x≤250)  ☐ Large (>250)

A.1.8. Mitigation / adaptation focus

☐ Mitigation  ☒ Adaptation  ☐ Cross-cutting

A.1.9. Date of submission

23 June 2018; 19 November 2018; 29 November 2018; 6 December 2018; 17 December 2018; 15 March 2019; 13 May 2019; 24 May 2019

A.1.10. Project contact details

Contact person, position
Keti Chachibaia
Regional Technical Specialist

Organization
United Nations Development Programme

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Telephone number
+66 2 304 9100 ext. 5091

Mailing address
United Nations Service Building
Rajdamnern Nok Avenue, Bangkok 10200 Thailand

A.1.11. Results areas (mark all that apply)

Reduced emissions from:

☐ Energy access and power generation
  (E.g. on-grid, micro-grid or off-grid solar, wind, geothermal, etc.)
☐ Low emission transport
  (E.g. high-speed rail, rapid bus system, etc.)
☐ Buildings, cities and industries and appliances
  (E.g. new and retrofitted energy-efficient buildings, energy-efficient equipment for companies and supply chain management, etc.)
☐ Forestry and land use
  (E.g. forest conservation and management, agroforestry, agricultural irrigation, water treatment and management, etc.)

Increased resilience of:

☒ Most vulnerable people and communities
  (E.g. mitigation of operational risk associated with climate change – diversification of supply sources and supply chain management, relocation of manufacturing facilities and warehouses, etc.)
☐ Health and well-being, and food and water security
  (E.g. climate-resilient crops, efficient irrigation systems, etc.)
☒ Infrastructure and built environment
  (E.g. sea walls, resilient road networks, etc.)
☒ Ecosystem and ecosystem services
  (E.g. ecosystem conservation and management, ecotourism, etc.)

A.2. Project / Programme Executive Summary (max 300 words)

1. Approximately 70% of Timor-Leste’s rural population (840,000 people) is highly vulnerable to climate changes, particularly increasing variability of rainfall and extreme weather events. Lives and livelihoods in the remote interior of the country and coastal regions are both highly exposed. Impacts of intensified extreme events include damage and degradation of decentralized small-scale critical infrastructure, particularly water supply and drainage structures, embankments, and feeder roads and bridges. Damages leave rural populations isolated, lacking basic services. According to climate change scenarios and risk models, occurrences of climate extremes and related damages will at least double towards mid-century.

2. The project objective is to safeguard vulnerable communities and their physical assets from climate change-induced disasters. It aims to address existing institutional, financial and legislative barriers, increasing the climate resilience
of vulnerable small-scale rural infrastructure. Output 1 focuses on strengthening the capacity of mandated institutions to assess and manage climate risks in order to maintain local infrastructure services. GCF-funded activities will embed new skills, technologies, and innovative methods in climate risk identification and mitigation processes. Monitoring and recording of climate risk information will be enhanced, and these data will be integrated into policies, standards, guidelines, and long-term investment planning for small-scale rural infrastructure. Output 2 focuses on implementing climate resilient building measures to improve small-scale rural infrastructure in vulnerable areas. GCF funds will assist in the development and implementation of catchment management strategies, supporting long-term resilience and climate risk reduction via landscape restoration and enhanced land stability, particularly in vulnerable catchments where small-scale infrastructure is present.

3. The project targets 175,840 direct beneficiaries, an estimated 15% of the total population. Benefits include increased climate resilience for small-scale infrastructure as well as 300 ha of reforested and rehabilitated land to buffer against climate-induced disasters. The project will ensure long-term infrastructure resilience via (i) embedding climate resilience standards into the processes through which small-scale infrastructure is planned, designed, constructed and maintained; (ii) improving climate hazard and risk assessment capacity and access to climate risk information. This project was developed at the request and full support of the NDA. All proposed interventions are aligned with the national determined contributions for adaptation, the National Adaptation Programme of Action, and strategic development plans. The project further ensures country ownership through strong stakeholder and community engagement components.

A.3. Project/Programme Milestone

| Expected approval from accredited entity’s Board (if applicable) | 23 June 2018 |
| Expected financial close (if applicable) | TBD [Date of agreement on the FAA between UNDP and GCF] |
| Estimated implementation start and end date | Start: 01/03/2020  
End: 28/02/2026 |
| Project/programme lifespan | Project Implementation: 6 years  
Benefit Stream: 20 years |

1 Small-scale rural infrastructure provision usually consists of a large number of comparatively small investments over a defined small geographical area and is therefore treated as a single sector in its own right, and is governed, financed and managed through decentralized sources and public services as a single sector.
## B.1. Description of Financial Elements of the Project / Programme

4. The Government of Timor Leste is seeking grant financing for the proposed priority adaptation investments to safeguard vulnerable rural communities and their physical and economic assets from climate change induced disasters. The project will invest in 6 target municipalities that are highly susceptible to the identified climate hazards.

5. The proposed measures are intended to lift barriers and strengthen capacity at all levels and do not lend themselves to reflow back to the government or private sector, hence requiring maximum concessionality in GCF grant financing. Small-scale infrastructure is designed, constructed, and maintained by the government. GCF funds will be used to scale up successful risk-based adaptation methods and technologies in order to “climate-proof” small-scale rural infrastructure and secure it against climate-induced hazards. GCF funds will complement public financing from the District Investment Development Plan (PDIM) at the municipal level and the National Programme for Suco Development (PNDS) at the suco, or village, level to provide decentralized infrastructure services in the most climate vulnerable districts of the country.

6. GCF funds will be complemented by co-financing of USD $37.087 million from 5 main sources.

   (i) First, the Government of Timor Leste has pledged annual Ministry of State Administration budget support of $12.5 Million USD in cash for PDIM and PNDS projects over 5 years from year 2 to year 6. This will be channelled towards covering the base cost of 64 small scale rural infrastructure units. These are baseline investments that will be supplemented by climate-proofing via GCF funding. These funds are leveraged from the total PDIM and PNDS budget allocations towards the most exposed units in the most climate vulnerable districts (as identified during the feasibility phase) whereby climate risk criteria and a potential to mobilize GCF climate funds influenced the government prioritization of the districts and units as a result of the proposed project.

   (ii) Government of Timor Leste has also pledged annual Ministry of State Administration budget support of annual Operations & Maintenance costs for the 130 resilient infrastructure units. Total O&M commitment (including both O&M during project implementation and post-project O&M) of GoTL is 29.4 Million USD for 20 years, out of which $7.187 Million USD covers year 3 to year 6 during project implementation and therefore is included as project co-financing. The remaining $22.213 Million USD would cover post project O&M for the next 16 years after project implementation and is not included as project co-financing (see Annex III(b) O&M Plan for further details). Therefore, the Ministry of State Administration total project co-financing is $41.9 Million USD.

   (iii) Government of Timor Leste annual Ministry of Agriculture and Fisheries budget support of $12 Million USD for support of agroforestry and reforestation of approximately 137 ha in the 6 target municipalities, which will include purchase of seedlings, labour for the establishment of plantations and the maintenance over 5 years (detailed under Output 2)

   (iv) Government of Timor Leste annual Ministry of Social Solidarity support of $5 Million USD for disaster risk management (DRM) activities in the 6 municipalities over 5 years from year 2 to year 6. This will include enhancing DRM, using the hazard maps, damage and loss systems and asset condition inspection tools developed by the project, and MSS’s strengthening capacity to provide effective local-level DRM with regard to safeguarding communities and infrastructure assets. This includes measures of preparedness, prevention, mitigation, as part of the programme of National Disaster Operation Center (NDOC), which will incorporate the new hazard and risk maps into preparedness planning and prevention, and implement the DRMapp as part of asset management and mitigation of disaster impact; and

   (v) UNDP co-financing – $0.4 Million USD in cash will be used for project management costs.

7. Operations and Maintenance for each the 130 infrastructure units has been calculated for a 20-year period and includes recurring annual and periodic maintenance\(^2\) based on total 20-year maintenance prorated costs across the

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\(^2\) Please see individual infrastructure unit tabs in excel spreadsheets XIII (h) 2-5, Ranking tab of excel file XIII (h) 1 and tables in O&M Plan Annex XIII (b), for the profile of maintenance costs for each infrastructure unit over 20 years.
20 years in line with international standards of assigning annual and periodic maintenance costs. O&M for the 20-year lifespan (25 years in the case of road and irrigation schemes) of the individual infrastructure units has also been included in the economics analysis of the viability of each infrastructure unit, and calculation of overall project viability, in line with standard international engineering best practice. The government commitment for O&M, is for a period of 20-years as is reflected in the GoTL O&M commitment letter (Annex IV(b)) which ensures O&M during the duration of the project (years 3-6) and beyond (years 6-20). Please see Section D2 - Exit Strategy and Annex XII (b) for more detail on the O&M strategy.

8. A breakdown of cost estimates by sub-component/Activity is provided below.

<table>
<thead>
<tr>
<th>Output</th>
<th>Activity</th>
<th>GCF funding amount (USD)</th>
<th>Govt. Co-financing amount (USD)</th>
<th>UNDP Co-financing amount (USD)</th>
<th>Amount for Entire Project (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output 1: Climate risk information is developed, monitored and integrated into policies, regulations and institutions to inform climate resilient small-scale rural infrastructure planning and management</td>
<td>Activity 1.1 - Develop and deliver climate risk information services and vulnerability mapping to all sectoral institutions</td>
<td>1,883,515</td>
<td>-</td>
<td>-</td>
<td>1,883,515</td>
</tr>
<tr>
<td></td>
<td>Activity 1.2 - Establish a database system for monitoring, recording and accounting climate induced damages in order to inform climate risk reduction planning and budgeting</td>
<td>790,512</td>
<td>4,470,057</td>
<td>-</td>
<td>5,260,569</td>
</tr>
<tr>
<td></td>
<td>Activity 1.3 - Refine ordinances, regulations and associated codes and standards to enable climate proofing small-scale rural infrastructure</td>
<td>573,233</td>
<td>-</td>
<td>-</td>
<td>573,233</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Output 1</td>
<td>3,247,260</td>
<td>4,470,057</td>
<td>-</td>
<td>7,717,317</td>
</tr>
<tr>
<td>Output 2: Climate risk reduction and climate-proofing measures for small-scale rural infrastructure are implemented to build the resilience of vulnerable communities in six priority districts</td>
<td>Activity 2.1 - Climate risk reduction measures for small-scale rural infrastructure are fully integrated into the planning and budgeting cycles of Village and Municipal development plans</td>
<td>1,186,049</td>
<td>-</td>
<td>-</td>
<td>1,186,049</td>
</tr>
<tr>
<td></td>
<td>Activity 2.2 - Implementation of climate-proofing measures for small-scale rural infrastructure</td>
<td>14,128,803</td>
<td>19,687,062</td>
<td>-</td>
<td>33,815,865</td>
</tr>
<tr>
<td></td>
<td>Activity 2.3 - Supporting catchment management and rehabilitation measures to enhance climate resilient infrastructure and communities.</td>
<td>3,129,732</td>
<td>12,000,000</td>
<td>-</td>
<td>15,129,732</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Output 2</td>
<td>18,444,584</td>
<td>31,687,062</td>
<td>-</td>
<td>50,131,646</td>
</tr>
<tr>
<td></td>
<td>Project Management Cost</td>
<td>664,961</td>
<td>529,943</td>
<td>400,000</td>
<td>1,594,904</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total project financing</td>
<td>22,356,805</td>
<td>36,687,062</td>
<td>400,000</td>
<td>59,443,867</td>
</tr>
</tbody>
</table>

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3 E.g. ILO states: “Whilst the cost of rural road maintenance is small relative to the asset value, it is crucial that maintenance is carried out on a timely and regular basis. Consequently, it is a recurrent activity and needs to be financed as such”. [https://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/documents/publication/wcms_100030.pdf](https://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/documents/publication/wcms_100030.pdf)

4 The Accredited Entity (AE) fee for the proposed project is at 7% or US$1,564,976.35. The budget figures presented in this proposal excludes the fee.
Please see Annex XIII(f) for the GCF budget breakdown by expenditure type (project staff and consultants, travel, goods, services, etc.) and disbursement schedule. The currency of disbursement is USD.
### B.2. Project Financing Information

<table>
<thead>
<tr>
<th>Financial Instrument</th>
<th>Amount</th>
<th>Currency</th>
<th>Tenor</th>
<th>Pricing</th>
<th>Seniority</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Total project financing</td>
<td>(a) = (b) + (c)</td>
<td>59.444 million USD ($)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) Senior Loans</td>
<td>Options</td>
<td>( ) years</td>
<td>( ) %</td>
<td></td>
<td>IRR</td>
</tr>
<tr>
<td>(ii) Subordinated Loans</td>
<td>Options</td>
<td>( ) years</td>
<td>( ) %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iii) Equity</td>
<td>Options</td>
<td>( ) years</td>
<td>( ) %</td>
<td></td>
<td>IRR</td>
</tr>
<tr>
<td>(iv) Guarantees</td>
<td>Options</td>
<td>( ) years</td>
<td>( ) %</td>
<td></td>
<td>IRR</td>
</tr>
<tr>
<td>(v) Reimbursable grants *</td>
<td>Options</td>
<td>( ) years</td>
<td>( ) %</td>
<td></td>
<td>IRR</td>
</tr>
<tr>
<td>(vi) Grants *</td>
<td>Options</td>
<td>( ) years</td>
<td>( ) %</td>
<td></td>
<td>IRR</td>
</tr>
<tr>
<td><strong>Total requested</strong></td>
<td><strong>22.357</strong></td>
<td>Options</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Please provide economic and financial justification in section F.1 for the concessionality that GCF is expected to provide, particularly in the case of grants. Please specify difference in tenor and price between GCF financing and that of accredited entities. Please note that the level of concessionality should correspond to the level of the project/programme’s expected performance against the investment criteria indicated in section E.

### (c) Co-financing to recipient

<table>
<thead>
<tr>
<th>Financial Instrument</th>
<th>Amount</th>
<th>Currency</th>
<th>Name of Institution</th>
<th>Tenor</th>
<th>Pricing</th>
<th>Seniority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grant</td>
<td>0.400</td>
<td>million USD ($)</td>
<td>UNDP</td>
<td>( ) years</td>
<td>( ) %</td>
<td>Options</td>
</tr>
<tr>
<td>Grant</td>
<td>12.500</td>
<td>million USD ($)</td>
<td>MSA</td>
<td>( ) years</td>
<td>( ) %</td>
<td>Options</td>
</tr>
<tr>
<td>Grant</td>
<td>12.000</td>
<td>million USD ($)</td>
<td>MAF</td>
<td>( ) years</td>
<td>( ) %</td>
<td>Options</td>
</tr>
<tr>
<td>Grant</td>
<td>5.000</td>
<td>million USD ($)</td>
<td>MSS</td>
<td>( ) years</td>
<td>( ) %</td>
<td>Options</td>
</tr>
<tr>
<td>Grant</td>
<td>7.187</td>
<td>million USD ($)</td>
<td>GoTL</td>
<td>( ) years</td>
<td>( ) %</td>
<td>Options</td>
</tr>
</tbody>
</table>

Lead financing institution: not applicable

* Please provide a confirmation letter or a letter of commitment in section I issued by the co-financing institution.

### (d) Financial terms between GCF and AE (if applicable)

N/A

### B.3. Financial Markets Overview (if applicable)

N/A
C.1. Strategic Context

9. Timor Leste is a least developed country\(^5\) and post-conflict society with a fast-growing population. The country remains dependent upon subsistence agriculture. Increasing climatic variability and unpredictability, particularly in relation to rainfall and extreme weather events, presents a significant risk to the lives and livelihoods of rural people. Timor Leste is prone to a number of climate-induced hazards including floods, landslides, and drought which result in frequent loss of lives and livelihoods. Impacts of intensified extreme events on critical rural infrastructure include damage and degradation of assets such as water supply and drainage structures, embankments and river protections, and community-level feeder roads and bridges. These damages leave rural populations without basic services and often in full isolation. Timor Leste’s Initial National Communication to UNFCCC (INC, 2014) recognizes two possible major impacts of climate change, including (a) a shift in seasonal and latitudinal precipitation patterns, and (b) an increase in the frequency and scale of extreme weather events. Climate change is expected to result in a more intense dry season and wet seasons characterised by fewer but more intense events, including El Niño events that may become more severe. These changes may exacerbate existing problems with drought, floods, and water quality. Water management infrastructure such as water storage, water supply and flood defence infrastructure is increasingly exposed to climate change impacts, thus necessitating additional and more resilient infrastructure as climate patterns change.

Climate change in Timor Leste

10. Temperature and Rainfall: Timor Leste’s Initial National Communication (INC) June 2014, under the United Nations Framework Convention on Climate Change (UNFCCC), recognizes two possible major impacts of climate change including: (i) a shift in seasonal and latitudinal precipitation patterns, and (ii) an increase in the frequency and scale of extreme weather events. Based on the analysis of historical data and the results of climate scenarios generated with both the Regional Climate Model (RCM) using the A1B emission scenario 20 Global Circulation Models (GCMs) using new emission scenarios, and Representative Concentration Pathways (RCPs)\(^6\) in Timor Leste:

- Temperature has been increasing consistently by around 0.016 degrees Celsius per year (INC, 2014). Prior to the 2040s, the mean temperature anomalies in Timor Leste are expected to increase by up to as much as 1°C for all emission scenarios. Projections based on IPCC AR4 CMIP3 models with SRES scenarios show that the mean temperatures during the 2041-60 and 2061-2080 periods are expected to increase from the current temperature between 1.5°C and 1.8°C and between 2.1°C and 2.7°C respectively. For the high emission scenario (RCP8.5) the increase in temperature relative to current conditions may reach 3°C by 2100, while for the low emission scenario (RCP2.6) it may increase by up to 0.5°C.
- Rainfall has been showing a downward-trend in the dry season and upward-trend in the rainy season in the last few decades. Rainfall is predicted to continue to decrease in the dry season and increase in the wet season with overall rainfall increasing by 7–13% by 2050. The most considerable increase is expected to occur in the June/July/August season during the 2041-60 period. The seasonal rainfall climatology in September/October/November is predicted to be drier than the historical baseline, especially in the 2061-80 period. In general, the seasonal rainfall climatology in the region will be much wetter during 2041-60 than the 2061-80 periods.
- Rainfall variability is also predicted to increase. In the future, the wet season onset may be delayed by about 20 days from the current climate pattern, while dry season onset may be delayed by as much as 11 days, depending on the period and emission scenarios. In addition, the drier area on the northern coast of the country (annual rainfall less than 1000 mm) will expand in the future. These changes in both spatial and temporal rainfall distribution will have significant impact on the water balance.

\(^5\) Timor Leste has a UN Human Development Index of 0.595 and ranks 133 out of 188 countries

\(^6\) Climate change assessments from the INC and other studies provides the evidence basis for the climate change discussion
Extreme rainfall events such as tropical cyclones are expected to decrease in frequency but increase in intensity. Furthermore, an increase in rainfall is predicted for areas of high altitude. For example, the mountainous districts are projected to experience higher increase in rainfall during the wet season. Since climate change is expected to result in a drier dry season and wetter wet season, intense events and El Niño events may become more severe. These changes are expected to increase intensities of droughts and floods.

11. Climate change-induced hydro-meteorological hazards: Geographically, Timor-Leste is exposed to several kinds of natural hazards, which include frequent events such as tropical cyclones, riverine flooding, drought, and landslides as well as rarer events (such as earthquakes and tsunamis). The most prominent and frequent hazard types in the country’s recent history include floods, landslides, and drought (prolonged dry spells). An assessment of the impact of climate-induced hydro-meteorological hazards on Timor-Leste under both baseline and climate change scenarios has been completed based on existing national-scale hazard maps and detailed socio-economic data on hazard receptors (including people, property, agriculture and infrastructure such as roads, bridges, and water supply). This assessment shows that, under climate change, there will be an increase in the number of areas and key infrastructure affected for all hazards. In most cases, at least a doubling of hazard-affected areas in percentage terms is expected. On average, the increase in impact of each hazard between the baseline and climate change scenarios nationally is 26.3%, 21%, 55.4%, and 55.8% for landslides, floods, erosion, and drought risk, respectively. The economic losses that could occur under climate change range from USD $203 Million, $37 Million, $10 Million, and $12.5 Million for landslides, floods, erosion, and droughts, respectively. These losses will impose significant additional financial burden on the government and affected population. At the same time, the frequency and intensity of climate extremes and disasters will necessitate additional infrastructure maintenance measures while also increasing the demand for additional protective features to be embedded into the design of new construction. These effects, in combination, will considerably increase the cost of construction, operations and maintenance of rural infrastructure. The implicit additional cost cannot be absorbed by local authorities or the general population and remains the responsibility of the government.

Climate-induced impacts

12. Climate-induced impacts on agricultural productivity. Agriculture is the most important socioeconomic sector in East Timor, accounting for approximately 75% of employment. The projected year-to-year variability and drier dry seasons will impact water resources and availability, increasing vulnerability to drought, in particular, in the absence of minimal water resource infrastructure for storage. In addition, with expected increases in rainfall in wet seasons, certain areas, such as the southern side of the country, will be further exposed to climate change-induced flooding. For example, Cova Lima, Manufahi, and Viqueque each receive more rainfall than northern districts, and experience two wet seasons each year. These events also increase the vulnerability of existing infrastructure further exacerbating water insecurity for agricultural productivity. Furthermore, rainfall variability and extreme events are expected to increase the intensity of runoff from the country’s mostly steep terrain further exacerbating soil erosion, incidence of landslides and flash flooding and low soil fertility for crop production. Limited land in mountainous areas means that fallow periods are short, resulting in declining yields which are further exacerbated by soil erosion and nutrient depletion, both of which will increase with climate change.

13. Given the heavy reliance on subsistence agriculture to survive, the population is therefore vulnerable to climate-induced hazards such as floods and droughts which lead to crop failures. Lack of water in the dry season is

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9 In developing the baseline and climate change risk assessment and damages and losses assessment, existing hazard maps were used and climate change impacts were inferred by assuming a worsening of the hazard categories (e.g. baseline medium hazard will become high hazard) etc. This enabled quantification of potential climate risks and impacts and is based on the best available information at project design stage. Note: Irrigation infrastructure data was not available so it is not included in the analysis. Note: Irrigation infrastructure data was not available so it is not included in the analysis.

10 Detailed socio-economic risk assessment is provided in Section 2.9 of the Feasibility Study (Annex II)
increasingly affecting agricultural production. Drought in 2001 to 2002, and the late arrival of the wet season in 2002 to 2003 resulted in an estimated 34% decline in maize production between 2002 and 2003. As a result, 110,000 people were identified as needing food aid, particularly in the drier maize producing districts of Aileu, Ainaro, Ermera, and Liquica. Overall, a potential loss equivalent to 6.7% of combined gross domestic product (GDP) per year by mid-century due to climate change impacts, is expected. Most agriculture, including maize is unirrigated, making it vulnerable to drought and irregular rainfall. Irrigation is also a critical input for rice production. However, most of these systems operate in the wet season only, due to insufficient water in the dry season; therefore, increased rainfall variability is expected to affect rice production, especially without the necessary investments required to build the resilience of water infrastructure to climate change. Rice crops in flood prone areas may also experience reduced production in the future because of increased flood events, while increased temperature may result in increased evaporation of water from paddies.

14. Climate change impacts on coastal and small-scale, rural infrastructure: Climate change is expected to intensify coastal flooding and erosion adversely impacting infrastructure such as buildings and roads, agricultural activity, and lead to increase in shoreline retreat. Additionally, natural hazards can cause substantial damage to the country’s fragile infrastructure and buildings which deteriorate over time by exposure to natural hazards (i.e. slow on-set hazards, coupled with poor maintenance) as well as injury and fatality to residents when natural hazards occur as disasters or high intensity events. More specifically, vulnerability is most prevalent in the decentralized rural infrastructure sector within Timor-Leste. Managed at a local level, this sector consists of a large number of comparatively small investments located in small geographical areas. Due to significant differences in size, scale and typological features between large scale centralized and small-scale decentralized infrastructure, the latter is treated as a single sector, financed through decentralized mechanisms of municipal and village level public finance. The rural infrastructure assets in this sector are characterized as small-scale units that have interconnected uses, rely on the same resources (eg. shared water source, shared land and shared topographic challenges), and thus are subject to impacts from interrelated climate hazards. Specifically, the most dominant climate risks to rural small-scale infrastructure are from flash floods, landslides, soil erosion, flooding and drought; and risks will only increase through the gradual intensification of these hazards due to climate change. Further detailed information on the physical and economic losses incurred from climate change and detailed analysis of risks due to climate-induced hazards are summarized in Section B.2 and further detailed out in Annex II Feasibility Study.

15. The exposure of rural communities to climate-induced disasters within Timor-Leste’s is exacerbated by un-favourable socio-economic conditions, limited access to infrastructure and services and limited adaptive capacity and resilience to enable effective response to or recovery from such disasters, which further deepens their deprivation. Women are notably at risk because of their comparatively limited education, income and ability to influence decision-making.

Social and economic vulnerability

16. The degree of geographic isolation/lack of access to urban areas coupled with socio-economic conditions demonstrates that most rural settlements in the country are highly vulnerable to climate change induced risks. Of the 89 sucos (villages) with the lowest living standards, the average share of households with electricity is only 3%. This compares with an average share of 66% in the 89 sucos with the highest living standards. Access to improved water and improved sanitation is also much higher in sucos with high living standards.

17. In addition to asset, social and infrastructure indexes, capacity to cope is also an important index of vulnerability. When coping capacity is considered, the analysis shows that the impact of climate change is dependent on the size of the change (the increase in % of the municipality which will be affected by the highest category of the particular hazard) as well as the coping capacity for that municipality. This analysis points to the need to enhance the coping capacity of communities. In addition, it provides a means of identifying where the enhancement of components of coping capacity needs to be prioritised to address the most vulnerable to climate change. In this case, that focus is on increasing the resilience of infrastructure assets.

18. When the impact of climate change with coping capacity considerations is assessed for each receptor type (roads, agriculture, water sources, houses) and taking all hazards into consideration, the following municipalities have emerged as the most vulnerable: Baucau, Ermera, Aileu, Viqueque Lautem and Liquica. The assessment of

Asian Development Bank, 2013. ‘Least Developed Sucos Timor Leste’
impact of climate-induced hydrometeorological hazards on rural infrastructure in Timor Leste, conducted during the Feasibility Study, has shown an increase of frequency of hazard occurrence and severity of impact under climate change. Severity of impact was shown to be dependent on the ability of communities to cope with hazards. The analysis shows that the increase in the areas affected as well as the number and length of key infrastructure affected, increases for all municipalities and for all hazards, with the worse affected municipalities being the 6 target municipalities.

National and Sector Policy Context

19. The Government of Timor Leste (GoTL) Strategic Development Plan (SDP 2011-2030)\(^1\) sets out government priorities, strategies, and actions covering three key areas: social capital, infrastructure development, and economic development. A central pillar of the GoTL’s Strategic Development Plan (2011-2030) is the building and maintenance of core and productive infrastructure to address the large infrastructure deficit and to enable Timor Leste to develop economically and socially.

20. District Investment and Village Investment Plans (PDIM and PNDS) outline small-scale rural infrastructure development priorities with an aim to address the current infrastructure deficit in rural settings. PDIM and PNDS provide secured annual budgets for small-scale rural infrastructure; however, this sector’s work proves particularly challenging as it provides decentralized infrastructure services in the interior of the country in the context of complex mountain terrain susceptible to climate hazards. Climate hazard risk reduction and mitigation are critical to include in construction and maintenance stages of small-scale rural infrastructure development.

21. According to Timor Leste’s NDC, priority adaptation measures will be focused on reducing adverse effects of climate change, promoting sustainable development, and reducing poverty. This is anticipated to be accomplished by employing new, as well as building on existing, strategies and plans across all sectors within Timor-Leste - including the National Priorities process. Stated NDC priorities include: Development of integrated agroforestry and watershed management including climate change dimensions; implementation of integrated, sustainable land management promoting fixed/permanent agriculture; reduced burning; reduced erosion and increased soil fertility; reforestation of degraded land to prevent landslides and provide a sustainable fuel wood source in priority areas with high vulnerability to climate-related risks; and improved physical infrastructure/civil engineering and natural vegetation methods to prevent landslides in hill sites, roads and river banks.

22. Timor Leste’s National Adaptation Programme of Action (NAPA) (2010), aims to implement the action plan to reduce the vulnerability of Timor-Leste to the consequences of climate change in all key sectors, through three cross-cutting strategic approaches. These approaches are to be embedded in all sectoral projects and programmes emerging from the NAPA process:

- Capacity development and institutional strengthening for stakeholders in matters related to adaptation to climate change and climate variability;
- The demonstration of new ideas and techniques through field based interventions that improve the resilience of the population and ecosystems; and
- Information, education, and communication campaigns for stakeholders on the risks due to climate change and climate variability.

23. The draft National Climate Change Policy intends to provide policy guidance to mainstream climate change into development policies and prioritize climate resilience in development plans. The draft policy specifies the need to promote climate resilience and climate proofing approaches in small-, medium- and large-scale infrastructure development, as well as the need to create a platform for better coordination between climate change adaptation and disaster risk management interventions. Furthermore, the draft policy highlights the need for vulnerability assessments and disaster risk assessments to complement the information on existing and potential loss and damage incurred by the climate change. The importance of decentralization is highlighted to emphasize the need for integration of climate resilience into different levels of governance. Though the policy remains in draft form, it provides direction and places a strong emphasis on addressing priority adaptation needs, including resilient infrastructure services, to safeguard communities and their assets.

\(^1\) Section 2.7 of the FS (Annex 2 of the FP) provides a detailed discussion on the infrastructure priorities set out in in the SDP
C.2. Project / Programme Objective against Baseline

24. Vulnerable small-scale rural infrastructure assets in Timor Leste include water supply systems, rural road and bridges, flood defences, and irrigation systems. These infrastructure units have small geographic footprints, are often embedded within a community, and are highly exposed to climate hazards including flash floods, landslides, soil erosion, flooding and drought. According to the data recorded in the Desinventar damage and loss database, flooding affects the highest number of people and infrastructure units in the country, with drought and landslides second. Physical damages and economic losses to rural infrastructure due to these hazards are likely to increase with climate change. More specifically, under climate change and with coping strategies taken into account, flood damages to property in the 6 identified target municipalities could total $9.9 Million USD (25% national total). From a single flood event under climate change, crop income could drop $0.5 Million USD (50% national total), while 41 irrigation systems (66.6% of the national total) and 13 water sources (34% national total) would be affected. Likewise, property damage due to landslides in the 6 target municipalities would be $117.4 Million USD (63% national total), while crop income could drop $8.3 Million USD (62.4% national total) from a single landslide event. Crop income losses from erosion in the 6 target municipalities would be $5.33 Million USD (54% of national total), while 53 Water Supply systems (37% of national total) and 205 Irrigation systems (65% national total) would be affected. Crop income losses from drought in the 6 target municipalities would be $6.7 Million USD (54% of national total), while 64 Water Supply systems (33% of national total) and 279 Irrigation systems (70% national total) would be affected.

25. In addition, the design and application of existing infrastructure and construction standards is not climate resilient, and there is limited investment in operation and maintenance. This is exacerbating exposure and resulting in the failure of infrastructure services, an essential factor in the development of rural communities. Impacts include isolation of communities when roads and bridges are damaged by localized extreme events, reduction in water yields due to droughts, contamination of unprotected water sources, flooding of communities due to inadequate flood defences. In addition, the institutional and financial capacity of local administrations and communities to adapt to the changing situation is weak. This includes the ability of municipality planning officials, engineers, and decision makers to identify areas that are critically vulnerable to climate hazards, to draw the links between ecosystems/catchment management and infrastructure development, and to identify, appraise, prioritize, design, cost and ‘budget in’ resilience measures.

Baseline Investment

26. With a full recognition for these vulnerabilities, the Government of Timor Leste is actively investing in infrastructure development to deliver essential services. The government has prioritized national and municipal rural roads and bridges, water and sanitation and drainage systems as critical infrastructure units for development. A central pillar of the Strategic Development Plan (SDP) 2011-2030 is the building and maintenance of core and productive infrastructure. It is therefore critical to ensure that these investments are carried out in full recognition of climate change-induced risks in order to secure the long-term longevity of their services to local communities.

27. The value of government expenditure on roads and bridges amounted to $253.6 million USD, or 16% of total government expenditure on infrastructure in the last five years. Expenditure on irrigation in the same period was relatively modest, at $14.4 million USD, or less than 1% of total expenditure. However, irrigation forms a strong basis for the achievement of the SDP’s objective of rice self-sufficiency, and national expenditures on irrigation were supplemented by donor financing. The level of expenditure on roads and bridges is forecast to increase, both in nominal terms and as a proportion of total expenditure on infrastructure, over the next five years. The allocated budget of $516.3 million USD for the development of roads and bridges during this period represents a substantial investment for Timor Leste, and is likely to be in excess of sustainable levels of $78 million USD per year.

28. The driver for irrigation schemes in Timor-Leste is rice production. The government strategy on the development and rehabilitation of irrigation schemes has been justified on the basis of the need to increase rice products to safeguard flood security. The GoTL Strategic Development Plan (SDP) 2011-2030 states that Timor Leste is aiming to increase

13 Property damage is used as a general indicator of vulnerability but property (houses) is not under consideration as infrastructure to be climate proofed.

14 Ministry of Finance, WB (2015) “Timor-Leste – Public Expenditure Review”. The level of expenditure on electricity is budgeted to be much lower over the next five years than in the past. This is because the construction of two major power plants (Betano and Hera) and the majority of the national grid had already been completed by the end of 2013.
the area of irrigated rice by 40% (from 50,000 hectares to 70,000 hectares) by 2020, which would require significant investment in rehabilitating and extending irrigation systems and improving water storage. The level of expenditure on irrigation is budgeted to increase from $14.4 million USD in the period from 2008 to 2013 to $46.5 million USD over the next five years, with plans for expenditure to a value of ten times that. The total value of expenditure in the period from 2008 to 2013 on irrigation, including financing provided by development partners, amounted to $83 million USD. Furthermore, agriculture sector plans under preparation suggest spending of up to $438 million USD on river-based irrigation, including the construction of large dams. These investments are mainly aimed at large scale irrigation infrastructure. However, a World Bank review of the SDP (2011-2030) highlighted a number of issues. The WB review found that in the period from 2003 to 2013, US$82 million had been invested by donor and government in the rehabilitation of a number of large irrigation schemes, but only resulted in modest increases in levels of rice production, which confirmed negative EIRRs derived for the irrigation strategy. The review found that only small community based irrigation schemes have generated acceptable EIRRs, suggesting that the irrigation strategy to support increased rice production is best achieved through these small community-based schemes. It recommended that the more cost-effective irrigation strategy would involve the use of TWSPS to supply supplementary wet and dry irrigation season water, together with the implementation of the current river WBRD irrigation strategy. A Seeds of Life review found that the proposed use of river diversion irrigation schemes will cost about $38.40 million per year ($480Mt) more than an alternative approach based on tube-wells and the use of small pumps, plus more intensive use of production inputs and marketing services. Seeds of Life Review also concluded that the economic cost of growing rice in Timor-Leste would be less than the cost of importing rice; about $440/Mt compared with $660/Mt using TWSPs systems, and by using an intensive “ricebowl” approach to irrigated rice production, rather than the current scattered “every district must have irrigation” approach would also reduce the cost of growing irrigated rice.

29. At the village and municipal levels, essential small-scale rural infrastructure investment is made via public funding under the PDIM and PNDS planning instruments (the local level planning and implementation processes). These processes have prioritised investments in small-scale rural infrastructure through the government budgetary allocations since 2011. Local budgets under PDIM and PNDS are annually planned and spent, ranging between $10.7 million and $76.9 million USD depending on the composition of target districts (see detailed breakdown in FS Chapter 6).

30. Since the start of the PDIM and PNDS process in 2011, 1,474 projects have been undertaken in the 6 target municipalities, accounting for about 49% of all PDIM and PNDS projects nationally. In addition, between 2014-2017, international donor-funded climate-resilience projects totalled $3.76 Million USD or 25.5% of the total donor funded projects nationally.

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31. These infrastructure investments are not systematically informed or guided by rigorous and comprehensive climate resilient strategies, although some climate-proofing standards have been applied on large scale sectoral investments. As infrastructure density increases, it will only leave much greater value of assets exposed to climate change-induced hydro-meteorological hazards. Furthermore, another critical gap is that overall national climate risk reduction strategies are weak and lacking. Without a comprehensive climate risk management framework and

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16 Maximum allocation of $150,000 USD per project (municipality level)
17 Maximum allocation of $50,000 per project (village level)
18 Please see Annex 2 of the Feasibility Study for a list of projects with climate resilience elements, funded by international funding bodies.
19 WB, IFC, and ADB investments do follow internal standards of climate proofing however, without embedding necessary institutional capacities and policy conditions into the national government as to enforce such standards in future, neither are these done to support the O&M requirements. These are simply beyond the scope of such loan programmes.
corresponding local enforcement capacities these investments can further disrupt already fragile land systems and contribute to much greater exposure to hazards and their consequences.

**Adaptation Solution**

32. Timor Leste urgently needs to safeguard communities and their physical assets from climate change-induced disasters. To enhance the climate resilience of the decentralized small-scale infrastructure sector, the government requires the knowledge, skills and capacity to secure functional longevity of the infrastructure under the conditions of a changing climate. Main threats to infrastructure assets include physical damage or destruction caused by extreme weather events; coastal flooding and inundation from sea level rise; changes in patterns of water availability; and effects of higher temperature on the overall performance of infrastructure. Climate change will affect all of these threats, and thus will impact where infrastructure is built and how it is designed and operated. Provision of decentralized infrastructure services therefore requires appropriate decentralized management tools and sufficient resources at the local level to effectively plan and supervise the development of infrastructure services. Such a system will rely heavily on local resources including labour, materials, communities and small contractors, and can draw on rural participatory methods for infrastructure planning, labour-based technology, community and small-scale contracting and maintenance.

33. Additionally, slope and land stability are foundational conditions for infrastructure stability. Changes in land use, in particular, affects watershed functions (drainage control, erosion processes and landslide susceptibility) that may increase exposure and aggravate consequences of hydrometeorological hazards at the catchment scale. These complex factors of infrastructure engineering and land use change in the context of catchment management need to be brought together as an integrated solution to a long-term resilience of people and their assets. Relying solely on engineering solutions of climate proofing is no longer sufficient given the level of uncertainties and how little we know about future climate change impacts in the long term. Furthermore, a focus on engineering solutions only may considerably increase costs. For example, without improving the broader climate risk reduction framework there would be a need for additional infrastructure dedicated to climate protection, such as sea defences or flood protection measures. In addition, more infrastructure is being developed within catchments which are experiencing increasing and intensifying hazardous natural processes due to climate change. Therefore, even investments in climate proofing and maintenance will become increasingly expensive and less effective with time, unless the catchment processes themselves are adapted to climate change through land rehabilitation and management at the catchment scale. Therefore, the normative solution will ultimately focus on the reduction in exposure to hazards as the way to avoid escalation of infrastructure development costs, via effectively combining the engineering solutions of climate proofing assets with sustainable land use choices to increase land stability and risk reduction. Thus, arresting erosion processes and combatting land degradation through community-driven and climate compatible land use choices is the key to the long term resilience of target communities and their physical and economic assets. Land use choices that are conducive to catchment rehabilitation and protection will be stimulated through climate responsive activities such as community agroforestry, alleviating pressure on the natural environment and reversing deforestation and land degradation. Furthermore, municipal finance options for climate resilient infrastructure and catchment management will ensure the long term financial sustainability of the proposed adaptation alternative.

34. The following climate proofing measures will be applied to the 4 target infrastructure types of decentralized small-scale rural infrastructure:

- **Revegetating land around rural water supply systems.** Climate-resilience approaches will include revegetating land around water sources, formalising informal sources (putting in pipes and collection/storage systems to enhance environmental protection and supply dependability), installation of standpipes in villages, and connection to existing sources in order to project water supply systems in light of climate change impacts.

- **Rehabilitation of rural bridges and slope stabilization of rural road corridors.** Climate-resilience approaches will include: rehabilitation of bridges that are usually washed away in the rainy season using climate resilient materials; protection of bridge openings with bioengineering methods (e.g. Vetivier grass); slope stabilization through implementation of sustainable structural measures (such as gabion baskets, vegetation of road corridors with bioengineering material like Vetivier grass, vegetation of road embankments, and re-sizing of drainage systems) that accommodate baseline levels of flows and projects levels of flow due to climate change.
• **Installation of rural flood defences to withstand climate change impacts.** Climate-resilience approaches will include design and installation of flood defences to withstand the increasing frequency and intensity of floods due to climate change. The designs will include bioengineering methods to protect flood embankments from climate-induced erosion where possible.

• **Formalization of existing and new rural irrigation systems.** Climate-resilience approaches will include formalisation of existing or newly installed rural irrigation schemes (including water storage systems) to store water for use in prolonged dry seasons and mitigate against intensified droughts that are projected to occur with climate change. With this intervention, the efficiency and stability of rural water supply for crop production will be secured and made resilient to climate risks of intensified droughts which will enhance the resilience of local agricultural system. In supporting only small community based irrigation schemes which include climate proofing, the project is also aligned with the finding that only these types of schemes are economically viable.

35. The proposed adaptation solution will enable transformational change by adopting a strategy to address the increasing costs of maintaining functional longevity of small-scale rural infrastructure under the mounting threats from climate change. If the current baseline is continued without the proposed interventions, not only will the recovery costs of reconstructing and maintaining vulnerable rural infrastructure progressively increase, but the local communities that are reliant these key rural systems will be put at imminent risk due to the intensifying impacts of climate change on these exposed rural areas. However, as an alternative pathway, GCF resources can reduce the impacts of climate risks by delivering climate proofed, site-specific, engineering designs that will be combined with bioengineering efforts and restoration of the catchment ecosystems within which these physical assets are located. This alternative pathway reduces not only the risk of losses and damages, but also the cost of construction and operations and maintenance compared to the baseline pathway. In addition, this alternative delivers significant auxiliary social, economic and environmental benefits. In this way, the proposed adaptation solution will create a paradigm shift in local and national practices by introducing a cost-efficient and climate-resilient pathway that enables the long-term protection of rural communities and systems to the increasing risks brought by climate change.

**Barriers**

36. To achieve the above adaptation alternative, there are a number of barriers, summarized below, that need to be overcome.

**Incomplete policies, standards and regulations that limit the implementation of climate resilient small-scale rural infrastructure**

37. The policies and laws governing climate change are established, such as draft National Climate Change policy and DRM Policy as well as some sectoral policies that include consideration of climate change. However, there remains regulatory and legislative limitation in implementing the climate change interventions prescribed in these draft policies. Moreover, several deficiencies and gaps in the enabling environment governing the implementation of infrastructure remain, which need to be addressed in order to embed climate resilience into the design, construction and maintenance of small scale rural infrastructure. The National Disaster Risk Management Policy, adopted in 2008, commits both the sectoral ministries and local communities, including suco (village) and aldeia (sub-village) chiefs to engage in both ex post and ex ante risk reduction. This policy covers a shift from traditional crisis response management to disaster, conflict, and climate change risk management. However, it remains too broad and is not guided by locally-specific information. In the absence of rigorous hazard and risk mapping as well as a damage accounting system, it is difficult to identify, plan, cost, and budget for risk reduction investments, especially in relation to physical infrastructure. Furthermore, sector ministries and local administrations are not guided by detailed operation protocols to effectively implement disaster risk reduction and climate resilience measures. Thus, the rural infrastructure that is being built may increase levels of exposure and risks of adverse impacts.

**Limited technical capacity to engineer climate proofing measures to infrastructure**

38. Technical capacity for compiling and analysing climate data for informing risk reduction practice is nascent. This includes capacities for producing hazard, risk and vulnerability maps and forecast bulletins. There is ongoing support
for Timor Leste to upgrade and modernize the hydrometeorology observation network both nationally and regionally. However, currently much of the meteorological and forecasting data for informing climate risk and vulnerability is available from regional centres such as the Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES) or the Australian Bureau of Meteorology, and data products focused on Timor Leste are limited. Planning institutions are, therefore, limited to inadequate and outdated information when planning for future climate change scenarios and climate-induced disasters.

39. Risk management practitioners at the national and sub-national levels are not able to use seasonal and long-term forecasts of climatic conditions to inform probabilistic assessments of risks posed by climate-induced disasters to infrastructure. Without such risk assessments, tailored measures for disaster and climate risk management cannot be developed. Specifically, with respect to compiling: i) climate risk assessments; ii) vulnerability assessments; iii) damage and loss assessments; vi) economic valuations that underpin different sectoral, national and sub-national plans; and vi) contingency planning, there is currently a lack of capability at national and sub-national levels. Without these necessary skills, it will not be possible for effective planning and implementation of climate change adaptation to support climate proofing of infrastructure in Timor Leste. Furthermore, engineering skills and knowledge of climate proofing is nearly non-existent. All key types of practitioners within the climate disaster management and infrastructure planning and development fields currently lack capacities to be able to systematically identify and assess climate-induced hazards or to include climate proofing measures in infrastructure design and construction.

40. The sectoral legislative and institutional enabling environment does not currently take a risk-informed cross-sectoral approach to addressing and incorporating climate change considerations. This has resulted in poor spatial planning, land use water resource management, and disaster risk management - all of which significantly affect the ability to plan and develop climate resilient infrastructure. Already weak institutional functions and capacities at national/centralized levels are even weaker at district/municipal and village (suco) level. All stages of the District Investment Development Plan (PDIM) planning must embed climate risk reduction criteria for decision-making - from suco-level prioritization, to reviews at administrative post and municipal levels, and clearances at the Ministries of State Administration and Strategic Planning and Investment through their joint technical committee. The PDIM manual currently does not include detailed guidelines for climate resilient infrastructure development. There is no standard operating procedure (SOP) for infrastructure use and maintenance that considers emerging conditions of climate change. Spatially expressed risk information at various timescales is not available to the PDIM planners and engineers to reference their siting decisions, choices of construction materials, and engineering designs in response to existing vulnerabilities and projected risks. Furthermore, there is a lack of capacity at municipal level for designing climate resilient infrastructure. Climate risk-informed District Investment Development Plan (PDIM) and National Programme for Suco Development (PNDS) processes are critical for resilient development of local communities and infrastructure services.

Weak capacity of municipal and village level institutions to plan, implement, and maintain network rural infrastructure that is resilient to the increasing impacts of climate change

For example, GIZ has been implementing the project ‘Global Climate Change Alliance’ (GCCA-TL) in Timor Leste since 2013 which has improved capacity of the Agriculture and Land Use Geographic Information System (ALGIS) to collect, analyse and share agromet data. 10 out of 12 ALGIS weather stations (AWS) are operational, a monthly edition of MAF Agro-meteorological Bulletin based on ground data is produced.

WMO is working with the government and civil society partners in Fiji, Papua New Guinea, Solomon Islands, Timor-Leste and Vanuatu to develop a potential Green Climate Fund (GCF) project that aims to markedly improve the countries’ Early Warning Systems “EWS Enhancing EWSs to build greater resilience to hydro and meteorological hazards in Pacific SIDS”
Limited options for financing climate resilient decentralized small-scale rural infrastructure at sub-national level

41. When planning and implementing infrastructure investments through municipal / district and village development planning mechanisms, broader landscape and ecosystem functions are not systematically considered a viable strategy to safeguard the investments. In both the short- and long-term, investments in ecosystems can protect and sustain built infrastructure and human livelihoods. However, the allocation of development resources in Timor Leste is focused on physical infrastructure. Consequently, the value of ecosystem-based approaches to climate risk management is overlooked. The local planning process does not consider management of watersheds, especially where areas requiring management are larger than individual sucos (villages). In such cases, watershed management activities would not be considered in the suco plans nor be brought up to the district plans. However, recognition of the watershed as a planning entity is beginning; the National Directorate for Forestry has initiated the process of developing watershed management plans for select sucos.

42. The economic deprivation of rural communities and lack of alternative livelihoods leads to harmful land use practices resulting in land degradation. There are currently no incentives for local communities to rehabilitate degraded watersheds and adopt land use and livelihood practices that contribute to sustainable management of land and forests, neither do the communities have any investment resources to engage in adaptive land use and livelihood activities. Thus, substantial areas of land have been cleared of vegetation in Timor Leste and are under-utilized. At least 30% of land area is suitable for tree growing. However, this potential is not used to stabilize the land or reduce hazard risks to the communities and infrastructure, nor is it utilized to unlock the socio-economic potential of agroforestry to enhance livelihoods. Furthermore, current PDIM and PNDS do not have funding criteria or requirement to embed additional cost of climate risk reduction to physical and economic assets. Hence there is currently no understanding of the investment requirements for climate proofing infrastructure under climate change conditions due to the lack of climate risk information and methods on which to base such investment planning. These have traditionally followed the annual investment planning cycle which is not conducive to embedding long term adaptation objectives. However, there are policy prerequisites to integrate climate and disaster risk management into these decentralized planning mechanisms that requires adequate enforcement capacities.

43. The combination of these four key barriers has hindered particularly vulnerable communities from effectively planning, establishing and utilizing approaches to protect and build the resilience of their physical and economic assets in the face of climate change. The proposed GCF project seeks to use the proposed adaptation alternative as a barrier-removal approach that will enable transformation and paradigm-shift in the current baseline towards a climate-resilient future.

C.3. Project / Programme Description

44. The main objective of this project is to safeguard vulnerable communities and their physical assets from climate change-induced disasters. First, the project will strengthen technical capacities of mandated institutions to assess and manage the risks of climate-induced physical damages and economic losses as well as integrate climate resilient measures into policies and planning. GCF funds will be used to embed new technical skills, improve availability of risk information, and create effective response mechanisms. Second, the project will implement climate risk reduction and climate-proofing measures for small-scale rural infrastructure in order to build the resilience of vulnerable communities in six priority districts. GCF funds will be used to introduce engineering skills and implement ecosystem based adaptation approaches for climate proofing of small-scale rural infrastructure that are essential to reducing prevalent social and economic vulnerabilities that will only worsen with climate change. In addition, GCF resources

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25. PDIM legal framework has been recently amended in 2016 in line with the deconcentrating/decentralization program that allows re-appropriation of the unspent budget. This new amendment allows administrative units to carry funds beyond the year of allocation. The decision on this appropriation is through consultation between the administration unit. The municipal and the line ministries responsible for the program to the following year.
will be invested in the development and implementation of catchment management strategies, which will support landscape restoration and land stability as climate risk reduction and long-term resilience measures. The rehabilitation activities will be undertaken in the catchment areas located in the areas of small-scale infrastructure units.

45. The project is supporting an ongoing decentralized investment framework which is administered through the PDIM and PNDS processes, by embedding the knowledge of climate risks and skills of climate proofing design, construction, operation and maintenance of rural infrastructure. Through the project, local authorities’ capacity for climate-risk informed development of long-term investment plans will be enhanced, thereby strengthening decentralized decision-making. Human resource capacity in managing climate risks to local development funding (including technical capacity for assessing proposals, ensuring performance standards, conducting safety, environmental impact and cost-effective evaluations of proposals, and monitoring local development projects) will be enhanced. The project is addressing the current gap in technical expertise in the target districts by developing a long-term capacity and resourcing plan and implementing training (including training of trainers, TOTs) focused on specialised climate proofing expertise for local experts, including architects and structural engineers. The project is also doing the following: strengthening the enabling environment and ensuring the availability and use of gender responsive climate risk and vulnerability data to inform risk assessments and the prioritisation of infrastructure; raising awareness and knowledge on the possible localized impacts of climate change on vulnerable livelihoods; embedding the use of site-specific natural systems in sustaining built systems and engaging communities to do so through catchment management and agroforestry, thus enhancing livelihoods; enabling engagement of local planners with communities through joint analysis of risks and changes in risk over time; enabling participation of households and communities in local development planning processes; and embedding long-term operations and maintenance arrangements with local participation to ensure long term sustainability of infrastructure, service delivery and local governance. The project is therefore addressing many of the current limitations of the decentralised investment framework to deal with climate risks to physical assets, as detailed in Section 6.3 of the Feasibility Study.

46. The following outputs will be delivered:

- Output 1: Climate risk information is developed, monitored and integrated into policies, regulations and institutions to inform climate resilient small-scale rural infrastructure planning and management
- Output 2: Climate risk reduction and climate-proofing measures for small-scale rural infrastructure are implemented to build the resilience of vulnerable communities in six priority districts

## Climate change drivers and impacts addressed by the project activities

<table>
<thead>
<tr>
<th>Output</th>
<th>Activity</th>
<th>Climate Change Drivers and Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output 1: Climate risk information is developed, monitored and integrated into policies, regulations and institutions to inform climate resilient small-scale rural infrastructure planning and management</td>
<td>Activity 1.1 - Develop and deliver climate risk information services and vulnerability mapping to all sectoral institutions</td>
<td>- Increased temperature and decreased rainfall in dry season that leads to increased and intensified droughts which impacts water supply and agricultural production.</td>
</tr>
<tr>
<td></td>
<td>Activity 1.2 - Establish a database system for monitoring, recording and accounting climate induced damages in order to inform climate risk reduction planning and budgeting</td>
<td>- Increased and intensified rainfall during wet season leading to increased floods, landslides, and erosion</td>
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<td>- Increased rainfall variability that impacts water balance</td>
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<tr>
<td></td>
<td></td>
<td>- Intensified extreme events and hazards leading to loss of lives, damage of property, loss of crop, damages in rural infrastructure (roads, bridges, and water supply)</td>
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<tr>
<td></td>
<td></td>
<td>- Increased financial burden due to climate-induced damages and losses</td>
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</table>

26 In Timor-Leste, expenditure on infrastructure is implemented through three windows, these being: 1) the line ministries’ Consolidated Fund of Timor-Leste (CFTL) budgets; 2) the Infrastructure Fund; and 3) the District Integrated Development Plan (PDID), now PDIM, a district development program which includes the construction of small-scale infrastructure projects with budgets of less than US$500,000. At the village level, the PNDS process is used for small-scale infrastructure of less than $150,000. The line ministries’ CFTL budgets are used to execute projects that have budgets of a value of less than US$1 million and which are expected to be completed within a year. The Infrastructure Fund, a multi-year fund that was established in 2011, is used to execute large projects with budgets to a value in excess of US$1 million and which are expected to take more than one year to complete. The main goal of the PDIM and PNDS is to develop the domestic private sector, with its secondary goals being to create an increased number of employment opportunities in rural areas and to provide high quality infrastructure demanded by the local population in these areas.
### Activity 1.3 - Refine ordinances, regulations and associated codes and standards to enable climate proofing small-scale rural infrastructure

- Increased and intensified droughts and prolonged dry seasons leading to water insecurity, loss of vegetation and loss of crops
- Intensified droughts leading to the increasing uncertainty in yield.
- Intensified extreme events leading to increased and intensified landslides that impact drainage and road stability
- Increased and intensified rainfall during wet seasons leading to erosion and damage of flood embankments, and requirement for increased flood protection
- Increased frequency and intensity of floods causing higher flood flow velocities and higher discharges that increase exposure and damage of roads, bridges and other rural infrastructure
- Increased soil erosion leading to increased risk of water source pollution, destabilization of soil, land degradation, loss of crop yield and greater exposure of physical assets
- Increased variability in rainfall and intensified rainfall during wet seasons leading to intensified runoff, soil erosion, landslides flash flooding and low soil fertility for crop production

### Output 2: Climate risk reduction and climate-proofing measures for small-scale rural infrastructure are implemented to build the resilience of vulnerable communities in six priority districts

| Activity 2.1 - Climate risk reduction measures for small-scale rural infrastructure are fully integrated into the planning and budgeting cycles of Village and Municipal development plans |
| Output 2: Climate risk reduction and climate-proofing measures for small-scale rural infrastructure are fully integrated into the planning and budgeting cycles of Village and Municipal development plans |
| Activity 2.2 - Implementation of climate-proofing measures for small-scale rural infrastructure |

- Increased and intensified droughts and prolonged dry seasons leading to water insecurity, loss of vegetation and loss of crops
- Intensified droughts leading to the increasing uncertainty in yield.
- Intensified extreme events leading to increased and intensified landslides that impact drainage and road stability
- Increased and intensified rainfall during wet seasons leading to erosion and damage of flood embankments, and requirement for increased flood protection
- Increased frequency and intensity of floods causing higher flood flow velocities and higher discharges that increase exposure and damage of roads, bridges and other rural infrastructure
- Increased soil erosion leading to increased risk of water source pollution, destabilization of soil, land degradation, loss of crop yield and greater exposure of physical assets
- Increased variability in rainfall and intensified rainfall during wet seasons leading to intensified runoff, soil erosion, landslides flash flooding and low soil fertility for crop production

**Output 1: Climate risk information is developed, monitored and integrated into policies, regulations and institutions to inform climate resilient small-scale rural infrastructure planning and management**

47. This output will address the gaps in policy, regulations, and institutional capacity to deliver climate resilient small-scale rural infrastructure. It will do so by addressing gaps in the climate risk knowledge base through the development and introduction of hazard, risk and vulnerability assessment and mapping methods, technologies and tools, and capacity development within the main central government institutions involved in climate change adaptation and disaster risk management. Climate-induced hazard, risk and vulnerability maps are essential for the assessment of current and future hazards, for the identification of receptors such as infrastructure, people and agriculture at risk, and for the design of hazard management solutions that fully accounts for climate change. There is currently no definitive or accurate hazard and risk mapping for Timor Leste and existing national-scale hazard maps are of a broad-brush nature, lacking the level of technical detail on which to base comprehensive climate risk adaptation and disaster risk management. The strategic assessment of risk to population, infrastructure, economic activity, and future development under conditions of climate change is a government priority to support and guide municipalities to wisely and rationally manage risk exposure to acceptable levels. Under this output, the project will also address gaps in the legislative and policy framework by supporting the elaboration of policies, legislation, guidelines, and standards to embed climate change considerations across all sectors relevant to infrastructure development. Furthermore, the project will facilitate the dissemination and sharing of common and definitive climate risk information needed by all sectors to embed climate risk considerations into their functions. The Climate Change and Biodiversity Centre (CCCB), established under the SSRI project, has a mandate to provide climate information services across all government institutions to facilitate climate responsive policies and decision-making and to undertake capacity building of government practitioners. The project intends to build the capacity of the CCCB to embed necessary skills training (ToT) for long-term sustainable delivery of the key aspects of the capacity development plan.

48. The Capacity Assessment Study funded by SSRI included a broad review of capacity deficits in all municipalities and provided a high-level review of capacity issues, taking full account of the training that was provided by SSRI and other projects. Hence, with regard to training and other aspects of capacity development, SSRI’s main contribution is an in-depth capacity development needs assessment and capacity development strategy formulated for a
sustainable practice of Small Scale Resilient Infrastructure – SSRI. The UNDP-GCF project is fully guided by and embeds the key elements of capacity development strategy at policy, institutional, and individual technical skill levels. The capacity development that had been identified for the GCF project is therefore building upon and complementary to that already undertaken by SSRI project and will importantly extend to other municipalities and embed capacity in the relevant institutions via the Training of Trainers (ToT) approaches and further development of central and municipality institutions within the PDIM and PNDS process.

Activity 1.1. Develop and deliver climate risk information services and vulnerability mapping to all sectoral institutions.

49. The GCF investment will be used to introduce technology, methodologies and capacities for the development of climate risk information and the long-term institutional capacity to undertake hazard, risk and vulnerability mapping in the future. Activity 1.1 will help develop and deliver climate services such as climate hazard and risk and vulnerability assessments, cost-benefit assessments for adaptation solutions and related training to responsible public servants across mandated institutions. The hazard and risk maps will be used for risk-informed decision-making for all aspects of development and risk management in the future. Uses will include development planning for zoning of development activity away from high hazards areas to avoid physical damages and economic losses to people, property and economic activity. Hazard and risk maps will be prepared for the whole of Timor Leste for the 4 main hazards - floods, landslides, soil erosion, and droughts.

50. This activity will introduce a bespoke GIS-based socio-economic risk model as a tool for risk assessment (including potential physical damage and economic losses modelling), cost-benefit analysis and the identification and appraisal of climate resilient intervention measures for strategic planning in the future. The hazard will be used in combination with infrastructure (bridges, roads and buildings), land use (settlements, agriculture, grazing lands, and conservation areas), property, and socio-economic data to model the socio-economic impacts of each hazard and produce vulnerability maps. The resulting vulnerability maps, based on the accurate hazard mapping of the current situation, will form the baseline. The baseline model will form the basis of future appraisal-led disaster risk management and climate risk-informed infrastructure planning. Central government and infrastructure practitioners will be trained in the use of the hazard and risk models developed and importantly, capacity will be built to enable the updating and maintenance of the models. Municipality engineers will also be trained in the use of the models for appraisal-led infrastructure planning.

51. Local field officers and village youth leaders will be trained in surveying techniques, including the use of global positioning systems (GPS) to undertake topographic surveys which will be required for the production and updating of flood risk maps and other community-based mapping for development, calibration and validation of the hazard maps. GPS will also be effectively used to record the coordinates of the infrastructure (as part of the asset mapping and asset management to be introduced in Activity 1.2) on the GIS hazard maps to inform planning and budget allocations. A series of technical staff trainings in climate risk modelling, mapping and vulnerability, cost benefit analysis (CBA) and project appraisal techniques, specifically in relation to infrastructure planning and development and climate-induced disaster risk management, will be delivered.

Activity 1.2. Establish a database system for monitoring, recording and accounting climate induced damages in order to inform climate risk reduction planning and budgeting

52. GCF investment will be used to strengthen systems for monitoring and recording climate-induced disaster events. GCF resources will allow an estimation of the economic damages caused by climate change-induced events and establish a database management system to monitor damages over time. These improved systems will provide evidence for budgeting and implementation of climate risk reduction measures, specifically in relation to community infrastructure services. Such an accounting system will complement the risk modelling under Activity 1.1 and together will help demonstrate that benefits of avoided physical damages and related economic losses can outweigh costs of climate proofing and risk reduction. The manual and digital templates, including the detailed guidelines and training for the MSS field officers on how to record damage and loss data will be developed. This will also include a mobile application to record the data and transmit to the central server in real time. Use of UAV technology / drones will be introduced to map out current hazard risk conditions effectively at the catchment scale. Climate risk profiling of such accuracy and scale will underpin the planning and implementation of risk reduction measures in hazardous and
densely populated areas. A series of trainings will be conducted on data management and analysis and data management standards and protocols will be introduced. Data sharing protocols will be put in place at all Ministries and Directorates holding relevant data resources. This activity will provide the profile of current climate risks and a means of systematically recording damages realised in actual events. Drone technology will be useful in mapping extent of current hazard conditions and in expediting the assessment of losses following extreme climate events. They will complement the observation network, enable more frequent surveys in remote and challenging topography, enable rapid post-event damage and loss surveys, assist in assessments and ground truthing, and provide condition inspections for infrastructure asset management (needed at an increasingly large scale due to the worsening impacts of climate change).

53. The existing Desinventar database in Timor Leste contains some 1,600 records from 2001 to present; however, the scale and capabilities of the database needs to be expanded in order to systematically account for all physical damages and economic losses associated with climate hazards that will enable evidence-based planning and budgeting for climate proofing and risk reduction investments. A Risk Management Application will be developed for the storage, analysis and management of disaster data. Relevant inputs and reports will be managed on a simple real time system available to all tracking the observation data, verification data and compensatory responses, and to collate and track disparate reporting. The benefits will include: rapid and simple access to data; single data storage database; shorter lead times from data requests to delivery; improved feedback through standard reporting; better ownership and accountability; transparency; data quality control; timely resource allocation (to affected area); costs savings for rapid assessment teams; reduced operational costs for damage and loss data collection and storage; and on-demand data, both to- and from- District and sub-District data from NDOC. This will greatly increase cost-efficiency and accuracy of developing real-time climate hazard data that is critical in informing and guiding policy design and planning for climate resilient rural infrastructure.

54. Currently the cost of disaster risk management including an average of 10 to 15 rapid assessments per year, is around $600,000 USD to $1.5 million USD if site mobilisation and other items are factored in. It is estimated that the Risk Management Application will cost approximately $500,000 USD to develop and operationalize. Based on qualitative estimations, it will result in long-term savings and efficiencies in institutional processes and will improve quality in the service, speed of response, quality of sector data and attributes in defining the physical/socio-economic characteristics of the disaster/event. It will transfer the National Disaster Operational Centres’ (NDOC’s) role from largely post-event compensatory to supporting more effective response during and immediately after the disaster. In addition, it will act as conduit for initiation and improvement of PDNA and will be validated by data collected by drones.

55. GCF resources will also contribute towards the application of an asset location and condition survey method (developed under the UNDP-GEF/LDCF Small Scheme Rural Infrastructure project) and will establish an asset management database on which to base damage and loss monitoring of infrastructure. GCF resources will also enable the introduction of asset inspection guidelines, methods and approaches, and will train MCIE, Ministry of Social Solidarity (MSS), Ministry of Public Works (MoPW) national and municipality staff in the use and maintenance of the datasets, and in condition inspection in order to improve effectiveness of climate proofing methods. In addition, the asset management database will be used for planning, costing and prioritisation of asset maintenance using principles of portfolio risk assessment. The project will develop essential processes for infrastructure asset management including, maintaining a systematic record of individual assets (costs, original service life, remaining useful life, physical condition, repair and maintenance consistency); developing a defined program of planned maintenance of infrastructure including repair and replacement; and implementing and managing information systems (e.g., updating Geographic Information Systems on which the system will be based) based on surveys. Such systematized asset management practice will enable effective planning and costing of climate proofing measures and will minimize the damages from climate hazards.

Activity 1.3. Refine ordinances, regulations and associated codes and standards to enable climate proofing small-scale rural infrastructure

56. Activity 1.3. will prepare a set of revised standards, guidelines and specifications for rural infrastructure, encompassing both technical and functional standards to respond to climate risk reduction requirements. The guidelines and SOPs for all infrastructure investments to be carried out under the municipal (PDIM) and village (PNDS) development plans will be developed. Trainings for the technical personnel and groups of engineers to enable full compliance with the revised standards and codes will be delivered. GCF investment will be used to embed climate
resilience into existing sectoral plans such as the Rural Roads Master Plan & Investment Strategy 2016–2020, and the National Water Supply Policy and Strategic Plan, an important framework that provides the medium- to long-term vision for the water sector and a framework for the institutional arrangements, overall operation and management of DNSA and coordination with other sectoral agencies and partners. Existing technical specifications will be reviewed to address the climate change resilience aspects of the specifications. Existing guidelines and manuals will be reviewed and strengthened thereby providing guidance for technicians and engineers to develop and design projects that are adaptable and resilient to climate change. In the case of small irrigation schemes, the guidelines would have to be developed from scratch. The existing Standard Method of Measurement (SMM) developed by Agency of National Development (AND) will be reviewed to ensure that it incorporates climate resilient design considerations, such as physical parameters and appropriate choice of materials. Other relevant and related standards that are in use in construction will also be developed (e.g. soil-bioengineering standards for infrastructure projects). Once developed, engineers will be fully trained in the use of the new specifications, guidelines, and manuals.

Output 2. Climate risk reduction and climate-proofing measures for small-scale rural infrastructure are implemented to build the resilience of vulnerable communities in six priority districts

57. Under this output, the project will work closely with the municipal and village level government investment programmes, including PDIM and PNDS, to climate-proof local small infrastructure investments in the geographic focus areas. Actual physical investments will be accompanied by the development of essential capacities as well as initiation of institutional and procedural systems required for scaling up climate resilient approaches to infrastructure development in the country. This output builds upon the SSRI project, considering lessons learned and deepening the level of intervention in the municipal and village development planning processes (PDIM and PNDS) in order to fully embed climate resilience into infrastructure design, implementation, construction and maintenance. It will do so via the development of manuals, guidelines and specifications using climate risk information and methods developed in Output 1, for all stages of the rural infrastructure planning and implementation, and by building capacity at the local level for implementing these new methods. Using the new approaches, the project will directly implement climate resilience measures for small-scale rural infrastructure to be rehabilitated or built within the six priority districts of Baucau, Ermera, Aileu, Viqueque, Lautem and Liquica following PDIM and PNDS priorities. Furthermore, watershed rehabilitation and management approaches will be embedded to reduce exposure of infrastructure to climate risk and thus safeguard infrastructure and climate proofing investments from long-term climate change impacts.

58. The identification and prioritization of climate proofing needs were undertaken as part of project design which included a risk assessment of the infrastructure units using the currently available national hazard maps, against which the existing and approved PDIM and PNDS infrastructure had also been assessed. The risk assessment was undertaken using a GIS-based socio-economic risk model that was developed for the preparation of this proposal. The assessment incorporates the hazard maps, all receptor data of existing and planned infrastructure (including roads, water supply systems, irrigation systems, flood defences, agricultural land, dwellings, land use categories, socio-economic indices) based on the latest 2015 census survey, and calculates the damages and losses to infrastructure, agriculture, property, and livelihoods, under baseline and climate change scenarios. The results of the risk assessment identified the extreme hazard categories of each hazard (moderate and high severity flood risk for prioritization and the 1 in 100-year flood depth for design of the infrastructure; high and very high severity drought; moderate and high severity erosion; and high and very high intensity landslide risk) for each infrastructure unit, which was then used to design the specific climate proofing intervention for each infrastructure unit. Section 2.9 of the FS provides the detailed results of the risk assessment, while Sections 10.2 and 11.11 detail the prioritization and design of climate proofing for the rural infrastructure projects. Annex 8 to the FS provides the prototype designs of climate proofing features of target infrastructure across all categories.

Activity 2.1. Climate risk reduction measures for small-scale rural infrastructure are fully integrated into the planning and budgeting cycles of Village and Municipal development plans

59. Activity 2.1 will introduce climate risk screening methods and embed climate risk reduction criteria across PDIM and PNDS planning and decision-making cycles. It will provide step-by-step guidelines for climate risk reduction measures for all categories of small-scale rural infrastructure through the following guidance: the PDIM manual – CAMP; Community-based management and maintenance – GMF manual, KAM – municipal procurement guidelines; and administrative post and the Ministerial Technical Committee review checklists. A team of technical staff of Equipment
Verification, Evaluation and Supervision (EVAS) experts will be trained to determine the likelihood and consequences of risk in relation to asset (infrastructure exposure and vulnerability). Their skills to engineer climate resilient designs and apply various methods of bioengineering (e.g. by use of local vetiver plants to stabilize the slopes and gabion structures) will be developed.

60. Interventions will embed the systematic use of climate hazard and risk information (to be developed under Activity 1.1) in the PDIM project identification process to provide a more comprehensive, robust and evidence-based means of identifying projects at the suco level. The GCF project will provide technical assistance to Administrative Post (AP) staff in prioritizing projects at this level and in undertaking an appropriate level of feasibility studies on which to base climate-risk informed project prioritization. At the municipal level, the GCF project will also introduce climate risk criteria into the prioritization process and include other methods of measuring benefits of projects based on the introduction of appraisal-led project prioritisation using socio-economic cost-benefit analysis methods and tools to be developed under Activity 1.1.

61. Capacity development will be provided to enhance the ability to incorporate climate-risk considerations into technical feasibility studies and will include introduction of investment feasibility considerations, introduction of socio-economic cost-benefit analysis, optioneering and options appraisal methods as well as environmental impact assessment that integrate climate change impact scenarios, to strengthen the feasibility process, safeguard investments and optimize engineering solutions.

62. At the detailed design level, technical assistance will be provided to introduce climate change considerations into design of infrastructure to ensure that they will accommodate likely changes of environmental variables (frequency and intensity of occurrence) expected with climate change. Importantly, the project will train municipality engineers in the new climate-risk informed infrastructure detailed design methods and will include specific training in the design of bio-engineering methods relevant to Timor Leste. Bioengineering capacity development will be accomplished through technical assistance and by providing dedicated training events.

63. In order to enhance the ability of infrastructure contractors to implement climate-resilient construction, the project will introduce processes for pre-qualifying contractors, based on specific criteria such as certification in prior trainings on implementation of climate-resilient projects, experience of implementing climate-resilient projects, experience of contract management of such climate-resilient projects and access to engineering expertise aligned with the types of climate resilient measures to be built into infrastructure (such as bioengineering methods).

64. The project will strengthen the monitoring capacity at Administrative Post (AP) level through the provision of appropriate engineering expertise during implementation. The existing AP staff will be trained in a full cycle project monitoring to enable compliance with new resilience standards and requirements. The project will also seek to embed all training described above into appropriate centralised training centre courses by assisting with the development of course curriculum and certification and using training of trainers approaches. Further details can be found in Annex II Feasibility Study.

Guidelines and Technical Specifications

65. In order to achieve continuity and support to these new roles and functions the project will support the development of the following manuals and guidelines for Climate-resilient Rural Infrastructure Projects in Timor Leste (SCRIPT)

- Manual/guidelines for the design and construction of rural road infrastructure – in collaboration with MSA, Ministry of Public Works and AND;
- Manual/guidelines for the design and construction of small irrigation schemes – in collaboration with Ministry of Agriculture and Fisheries, Ministry of State Administration;
- Manual/guidelines for the design and construction of rural water supply infrastructure – in collaboration with Ministry of Public Works.

66. Technical specifications for rural infrastructure will be reviewed and revised to improve the quality and adaptability of the construction to climate change for the various infrastructure types. The Technical Specifications forming part of the contract documents for the design and construction of roads, bridges and drainage structures will include specific sections for various elements such as excavation, gravel, concrete, masonry works, drainage, retaining-walls, etc. There will be a review of these specifications to include of a section/chapter on climate adaptation features/elements of each road, bridge and drainage infrastructure asset (for example, scour-checks, check-dams, rip-raps, gabions,
soil-bioengineering, etc.). The project will review existing specifications which need to be revised and improved to respond to changing climate and existing conditions in the ground. This may include the design for retaining walls, specifications for the strength of concrete in various applications, and details for reinforced concrete and masonry. Existing guidelines and technical specifications for water supply systems will also be reviewed and enhanced to include climate resilient design.

67. Overall, GCF funds will be used to enhance the existing technical capacity to account for climate resilient engineering designs, solutions and practices that are essential for the reduction of prevalent vulnerabilities in the most climate vulnerable districts. In addition, GCF proceeds will be invested in the development and implementation of catchment management strategies, which will support landscape restoration and land stability as climate risk reduction and long-term resilience measure. The rehabilitation activities will be undertaken in the catchment areas located in the areas of small-scale infrastructure units.

Activity 2.2. Implementation of climate-proofing measures for small-scale rural infrastructure

68. Small-scale rural infrastructure in the target districts and villages will be climate proofed. The key interventions include: revegetation of land around rural water supply systems, formalization existing and new rural irrigation systems, rehabilitation of rural bridges, slope stabilization of rural road corridors and installation of climate resilient rural flood defences (protective gates, gabions, and bio-engineered defences). Revegetating land around rural water supply and formalization of existing and new rural irrigation systems will address risks of changing water availability patterns and especially drought events. Slope stabilization of local village and municipal road corridors and rehabilitation of bridges will enable rural communities to overcome isolation and also have access to emergency evacuation routes during extreme climate events and disasters. Installation of climate resilient rural flood protection will create water flow control and flood risk management infrastructure. These small-scale rural infrastructure units will be established in the six target districts as the means to address adaptation deficit where the social vulnerabilities and exposure to climate risks are particularly high.

69. Based on the municipal level climate change risk and vulnerability assessment undertaken in the feasibility study, the project will target the 5 municipalities worst affected by multiple hazards: Baucau, Ermera, Aileu, Viqueque and Lautem. In addition, Liquica, which is at high risk from flooding and landslides only and for two receptors (houses and agriculture) only, and therefore did not rank within the top 6 has been included as it represents a municipality with significant deficit of flood protection infrastructure and will address one of the hazards with the greatest and most frequent impact on communities.

70. A total of 130 infrastructure units have been identified, (SSRI project investments were used as a reference for costing, per unit cost, including base cost for construction to be covered from municipal funds and climate proofing cost to be covered from GCF funds). PDIM and PNDS implementation has averaged 493 infrastructure units and $54 Million USD per year between 2011 and 2016 nationally. Over the 5 years of infrastructure implementation, PDIM and PNDS investments in the 6 target municipalities will be $12.5 Million USD and this amount has been committed as co-financing toward the 130 infrastructure units identified for this project (see Annex IV for government co-financing letters). Therefore, PDIM and PNDS co-financing will cover 49% of the investment in infrastructure and will cover the base cost of construction and/or rehabilitation of selected infrastructure units. Therefore, PDIM and PNDS co-financing will cover 49% of the investment in infrastructure and will cover the base cost of construction and/or rehabilitation of selected infrastructure units.

71. The following chart provides a breakdown of infrastructure units by type for each Municipality

Table 1: Breakdown of infrastructure type and costs by municipality (FP= Flood protection; IS= Irrigation System; RR=Rural Roads; WS = Water Supply)

<table>
<thead>
<tr>
<th>Municipality</th>
<th>FP No.</th>
<th>FP Costs</th>
<th>IS No.</th>
<th>IS Costs</th>
<th>RR No.</th>
<th>RR Costs</th>
<th>WS No.</th>
<th>WS Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aileu</td>
<td>5</td>
<td>740000</td>
<td>3</td>
<td>325000</td>
<td>14</td>
<td>2447472</td>
<td>3</td>
<td>265000</td>
</tr>
<tr>
<td>Baucau</td>
<td>2</td>
<td>525000</td>
<td>7</td>
<td>445000</td>
<td>5</td>
<td>1549973</td>
<td>9</td>
<td>875000</td>
</tr>
<tr>
<td>Ermera</td>
<td>1</td>
<td>72900</td>
<td>4</td>
<td>1035000</td>
<td>9</td>
<td>4048800</td>
<td>6</td>
<td>775000</td>
</tr>
<tr>
<td>Lautem</td>
<td>4</td>
<td>612500</td>
<td>6</td>
<td>961687</td>
<td>5</td>
<td>799882</td>
<td>11</td>
<td>745000</td>
</tr>
<tr>
<td>Liquica</td>
<td>5</td>
<td>950000</td>
<td>2</td>
<td>600000</td>
<td>9</td>
<td>3784987</td>
<td>3</td>
<td>340000</td>
</tr>
</tbody>
</table>
72. In each of the target sites, a mixture of interventions will be used according to the needs of each site. The summary of each type of intervention and projected costs are listed in table and further detailed out in Annex II Feasibility Study. The proposed climate proofing interventions will directly benefit 19,751 households or 175,840 people that represents 14.65% of the population of Timor Leste.

Table 2: Number of infrastructure units by type that will be implemented under Activity 2.2

<table>
<thead>
<tr>
<th>Climate Proofing Measures</th>
<th>Description                                                                IFI</th>
<th>Units</th>
<th>Approximate Cost (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revegetating land around rural water supply systems</td>
<td>• Revegetating land around sources</td>
<td>38</td>
<td>3,755,925</td>
</tr>
<tr>
<td></td>
<td>• Formalising informal sources (putting in pipes and collection/storage</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>systems to enhance environmental protection and supply dependability)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• to address increasing uncertainty in yield of informal sources due to</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>intensifying droughts and the increased risk of source pollution from</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>increasing soil erosion. Formalising collection through small-scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>reservoirs enables storage during the wet season, and use in the dry</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Installing standpipes in villages to address increasing uncertainty in</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>yield of informal sources due to intensifying droughts that is resulting</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>in conflict over water use. Standpipes enable equitable distribution</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>among villages</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Connecting to existing sources in order to project water supply systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>in light of climate change impacts of increasing uncertainty in yield of</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>informal sources due to intensifying droughtness and the increased risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>of source pollution from increasing soil erosion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formalization of existing and new rural irrigation systems</td>
<td>• Formalising existing or newly installed rural irrigation schemes</td>
<td>25</td>
<td>3,681,687</td>
</tr>
<tr>
<td></td>
<td>(including water storage systems) to store water for use in prolonged</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>dry seasons and mitigate against intensified droughts that are projected</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>to occur with climate change</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Through this intervention, the efficiency and stability of rural water</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>supply for crop production will be secured and made resilient to climate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>risks of intensified droughts, enhancing the resilience of local</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>agricultural systems.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Installation of rural flood defences to withstand climate</td>
<td>• Designing and installing flood defences to withstand the increasing</td>
<td>20</td>
<td>3,429,150</td>
</tr>
<tr>
<td>change impacts</td>
<td>frequency and intensity of floods due to climate change</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Designs will include bioengineering methods to protect flood</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>embankments from climate-induced erosion where possible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rehabilitation of rural bridges and slope stabilization of</td>
<td>• Rehabilitating bridges that are usually washed away in the rainy season</td>
<td>47</td>
<td>14,791,488</td>
</tr>
<tr>
<td>rural road corridors</td>
<td>using climate resilient materials. Bridges are increasingly at risk of</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>failure during floods due to higher flood flow velocities and higher</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>discharges due to climate change.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Protecting bridge openings from higher flood flow velocities and higher</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>discharges and increased erosion, with bioengineering methods</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(e.g. vetivier grass)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

27 The total value of all infrastructure projects/units is 25.7 million USD. The GoTL is providing 12.5 Million of this total through PDIM and PNDPS funds towards the highly exposed units in the most climate vulnerable districts. It also covers 7.187 million USD O&M costs from year 3 to year 6 (during the project implementation). The referenced 33.8 million USD comprises: GoTL (MSA) 12.5 million + 7.187 Million = 19.687 Million, and 14.1 million USD of GCF financing.

28 The number of direct beneficiaries of the 130 infrastructure projects/interventions alone is 119, 498. Complementary catchment management activities have been estimated to result in an additional 56,342 direct agro-forestry beneficiaries. This gives a total number of direct beneficiaries of 175,840 beneficiaries of Output 2.
- Slope stabilization through implementation of sustainable structural measures (such as gabion baskets, vegetation of road corridors with bioengineering material like vetivier grass, vegetation of road embankments, and re-sizing of drainage systems) that accommodate baseline levels of flows and projects levels of flow due to climate change. These measures will address the intensifying erosion and landslide risks of embankments above and below rural roads in the steep rural environment and will provide drainage for the increasing road drainage flow velocities that are required due to climate change.

| Total | 130 | 25,658,250²⁹ |

73. A cost-benefit³⁰ analysis has been conducted on all 130 units and they have been ranked and prioritised based on their internal rates of return (IRR) and the number of associated beneficiaries, into high, medium and low priority (dark to light blue cells in Table below) which will dictate the order or priority in which they will be implemented during each implementation year. This is to ensure that the highest priority projects benefitting the most people will be completed first. The IRR calculation includes the cost of maintenance (periodic and annual) that would be required over a 20-year lifespan of the infrastructure.

74. Rehabilitation of rural bridges and slope stabilization of rural roads are the most expensive accounting for 57% of total project costs (and 36% of the number of projects), with only 34% of all interventions falling in the high and medium priority categories. This is mainly a reflection of high maintenance costs associated with bridges and road corridors despite the large benefits that road projects will bring to rural communities. For example, without maintenance included in the IRR calculation, 84% of bridges and road corridors fall within the high and medium priority categories. It is also a reflection of the isolation of some communities that will benefit from the climate resilient roads such that the beneficiary numbers of some of the schemes are low compared to the overall cost. However, it is specifically to relieve the isolation of communities that many of these interventions are needed and to secure the economic activities that vulnerable communities are heavily dependent on. It also points to the need to ensure a proper maintenance strategy to capitalise on the gains that will be made from climate proofing. It is likely that climate proofing will reduce maintenance costs, so the values used reflects the reduced maintenance that climate proofing will provide, balanced against the need for increased maintenance with worsening climate-induced hazards that will be incurred.

75. Revegetating land around rural water supply systems has the two highest proportions of interventions in the high and medium categories (91%) which reflects the relatively low capital and maintenance costs, compared with the numbers of beneficiaries, as well as the socio-economic gains that will be realised by rural communities. Revegetation activities refer to localised revegetation of the land around water sources which, if degraded, can lead to erosion around water sources, pollution of water sources due to sedimentation being washed into the water sources, and reduced functionality of sources. Localised land degradation can also lead to undermining and damage of transmission lines. As part of the climate-proofing of water supply sources, there is usually a need to address these localised land degradation issues to ensure land stability. The cost of revegetating land around water supply systems, is included in the infrastructure costs of the water source infrastructure. This is a typical engineering practice to stabilize the land prior to construction. Hence, the costs of revegetation account for only a small part of activity costs, and the main portion of the activity costs are related to the climate proofing of rural water supply infrastructure units to be implemented. It should also be noted that the revegetation under 2.2 is not the same as the agro-forestry and reforestation under Activity 2.3.

76. The proposed GCF project will provide only the water supply systems/infrastructure with no physical intervention/infrastructure for sanitation. However, the water supply systems that are implemented will have a direct positive impact on sanitation and hygiene, as the water supply systems provide water not only for drinking purposes, but also for washing, cleaning and other domestic purposes. In the design of the systems, there is provision for adequate supply of water for drinking and other domestic purposes including sanitation, including flushing of toilets where improved facilities are constructed and hygiene practices (bathing, washing, etc.). Water supply infrastructure

²⁹ $12.5 Million will be government co-financing
³⁰ Details of method and discussion of results of the cost-benefit analysis is contained in Annex 8 of the feasibility report
that the project will implement will therefore provide opportunities for households to follow the Community-led total sanitation approach (CLTS) and install pour flush latrines or flush toilets. During project formulation, consultations were undertaken with NGOs that are working in Timor-Leste on WASH interventions that have stated that the key issue regarding improved sanitation and good hygiene practices has been lack of water availability due to lack of infrastructure. There are areas for collaboration, particularly in the management of water supply systems, with interventions focusing on sanitation and hygiene. In particular, provision of community water stands, promotion of good hygiene practices by raising awareness and instilling behavioural change have been considered the areas for partnership and collaboration with organizations that are working on these issues in Timor-Leste. Under the leadership of Director General and as part of the National Water Forum set up at the Department of Water and Sanitation of the Ministry of Public Works consultations have been held and cooperation agreed with WaterAid, UNICEF, WHO and other agencies who have sanitation and hygiene interventions in rural communities and signed the letter of commitment for cooperation (Annex XIII (d-2) – Annexure 1). While the project does not include physical interventions such as building toilets, the GCF project will ensure that the Standards for improved sanitation facilities embeds climate proofing approaches and WHO standards on sanitation. Hence, the increased availability and reliability of water supply to households through the climate proofed water supply units to be implemented by the project means that households will be more inclined to install improved sanitation methods that require the use of water, such as the pour-flush toilets, and additionally benefit from interventions from NGOs and other organizations that are actively supporting sanitation practices. This is fully in line with the government’s National Sanitation Strategy that aims at full CLTS targets by 2020-21. In fact, the evidence shows that certain municipalities that have been previously declared as Free from Open Defecation turned back to open defecation practice due to unavailability of water for flushing and sanitation as well as hygiene. The table below shows that the states of sanitation coverage in GCF project target municipalities.

Table 3: Sanitation facilities / methods of private households at GCF target municipalities of Timor Leste

<table>
<thead>
<tr>
<th>Administrative Post and Suco</th>
<th>Private Households</th>
<th>Proportion of flush &amp; latrine toilets</th>
<th>Status of Open Defecation Free (ODF) (meaning that all people in all households have access to toilet. ODF is part of the implementation of PAKSI (Action Plan for Community Sanitation and Hygiene) of the Ministry of Health (MoH)).</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total flush toilet</td>
<td>%</td>
<td>Total latrine</td>
</tr>
<tr>
<td>Aileu</td>
<td>7,598</td>
<td>2593</td>
<td>34%</td>
</tr>
<tr>
<td>Baucau</td>
<td>22,976</td>
<td>6152</td>
<td>27%</td>
</tr>
<tr>
<td>Ermera</td>
<td>20,671</td>
<td>5601</td>
<td>27%</td>
</tr>
<tr>
<td>Lautem</td>
<td>12,050</td>
<td>2965</td>
<td>25%</td>
</tr>
<tr>
<td>Liquica</td>
<td>11,885</td>
<td>3,557</td>
<td>30%</td>
</tr>
<tr>
<td>Viqueque</td>
<td>15,297</td>
<td>2,585</td>
<td>17%</td>
</tr>
</tbody>
</table>

77. Formalization of existing and new rural irrigation systems include interventions, of which 66% fall in the high and medium priority categories.

78. Installation of rural flood defences to withstand climate change impacts shows only a small proportion of high and medium priority projects (20%) and this is in large part, due to the very small numbers of beneficiaries, agricultural land and property that can be protected by individual flood defences. It is likely that flood risk management strategies that do not only include infrastructure will need to be examined and the right combination of structural and non-

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31 Open Defecation Free – ODF means that all people living in a municipality exclusively use toilets rather than defecating in public places. The ODF team, together with municipality ODF secretariat team, monitor and encourage people to build toilets for themselves, Suco Councils verify ODF. (Source: [https://www.wateraid.org/au/articles/liquica-announces-open-defecation-free-status?fbclid=IwAR1Zvz8ZGhnwAxl09MVTXJj3JXyhsIPNENFTI8hJkKv16-ECuBKYShMZd](https://www.wateraid.org/au/articles/liquica-announces-open-defecation-free-status?fbclid=IwAR1Zvz8ZGhnwAxl09MVTXJj3JXyhsIPNENFTI8hJkKv16-ECuBKYShMZd)As CLTS is progressing and more households are having sanitation installations the data will be verified and updated at the inception stage of the project.
structural measures implemented (e.g. soil-bioengineering and broader sub-catchment restoration and management). It is noted that actions under Activity 2.3 will address ecosystem-based methods of resilience and will have attendant benefits on flood risk management, but the cost-benefit of these have been assessed separately (see Activity 2.3).

79. With regards to the use of hydro-meteorological data in the climate proofing measures of water supply systems, the most common system in rural Timor-Leste for both water supply systems and irrigation schemes are gravity fed (from springs, surface water collected from catchment – water capturing and rivers). Climate proofing design of small-scale irrigation and water supply units embeds consideration of drought discharge volumes and recharge rates to ensure continuous functionality of the system and water availability, as well as water source protection measures to reduce the risks of drying out water sources and catchment rehabilitation to stabilize water yielding capacities of the catchments. For the water supply systems, the reservoir sizing has been designed based on the population (beneficiaries) and using the national average of 35 litres per person per day (as per the manual for water supply systems) with provision for population growth for at least 20 years or the design life of the water supply systems, and 30% increase factored into the design to account for capacity requirement due to climate change impacts which will increase the water needs/consumption (see Section 11.11 of the FS for further details).

80. Taking in to account the above and with the aim of addressing the deficits of small-scale rural infrastructure, the project will formalize existing systems by surfacing the irrigation and water supply transmission earthen channels, which will reduce transmission losses, improve the serviceability to farms and increase the efficiency of the channels during low flows and dry periods. The formalization and implementation of irrigation infrastructure has two key positive impacts (1) increased capacity of the community to produce crops more than once per year and (2) increase in cultivable lands due to availability and improved reliability of water.

81. With regards to the interventions relating to water supply, water storage reservoirs will improve supply reliability during dry season and reservoirs will be managed by the water management group (GMF) that will agree on the operating rules during the dry season based on water availability and reservoir recharge rates. The combined efforts of climate proofing of physical structures of the existing and future infrastructure and catchment rehabilitation for its runoff formation and drainage control services ensures stability and functionality of the target infrastructure in the face to evolving climate risks.

82. Furthermore, the proposed water supply interventions have taken into consideration provisions for adequate supply of water for drinking and other domestic purposes including sanitation (flushing of toilets where improved facilities are constructed) and hygiene practices (bathing, washing, cleaning and etc.). Also, when water is not available, households are less inclined to use improved sanitation methods that require the use of water, such as the pour-flush toilets. However, with the installation of the water supply systems, households can self-construct improved sanitation facilities and can benefit from interventions from NGOs and other organizations that are actively supporting sanitation practices. In this way, the water supply systems that are implemented will have a direct positive impact on sanitation and hygiene.

83. During project formulation, consultations were undertaken with NGOs that are working in Timor-Leste on WASH interventions that have stated that the key issue regarding improved sanitation and good hygiene practices has been lack of water availability. There are areas for collaboration, particularly in the management of water supply systems, with interventions focusing on sanitation and hygiene. In particular, promotion of good hygiene practices by raising awareness and instilling behavioural change has been considered as part of public awareness activities for beneficiaries through partnership and collaboration with organizations that are working on these issues in Timor-Leste. This partnership was discussed with WaterAid that has sanitation and hygiene interventions in rural communities. UNICEF, WHO and Ministry of Health (environmental Health department) also have programmes that provide opportunities to collaborate on public awareness programmes to address hygiene issues. The GCF project will collaborate and complement these efforts.

84. This preliminary project identification, outline scoping and cost-benefit analysis will be refined during the project and will be based on detailed hazard mapping. It will utilise the robust cost-benefit assessment and appraisal-led methods and tools to be introduced by the project under Output 1. In refining the assessment, the viability of each scheme will be determined and additional criteria used to ensure that the most beneficial schemes are implemented as priority. The $25.66 million (including $12.5 Million co-financing) USD budget is therefore an upper limit of capital costs that the project will cover in implementing these infrastructure schemes.
Investment Planning

85. As discussed above, currently the PDIM and PNDS do not have funding criteria or requirement to embed additional cost of climate risk reduction to physical and economic assets and there is currently no understanding of the investment requirements for climate proofing infrastructure due to the lack of climate-risk information and methods on which to base such investment planning.

86. To address this barrier, the project will develop and implement new approaches to investment planning to ensure that infrastructure investment including annual and periodic maintenance which can be met in the long-term and will include climate proofing. Approaches will include:

- Embedding climate proofing in the PDIM and PNDS project identification and screening processes from village level project identification through to project feasibility, design and costing.
- Identification of financing models for investment maintenance costs (e.g. of community-based scheme that involve the use of tariffs or in-kind contributions to establish municipal maintenance programmes (e.g. GMF as being done on SSRI) or engagement of private sector in infrastructure maintenance financing).
- Development of municipal infrastructure investment plans based on risk-informed project designs, including maintenance, and cost-benefit analysis based on CBA methods and models to be introduced in Activity 1.1.
- Use of municipality investment plans for technical justification for central budget allocation to cover investment and maintenance cost of climate resilient rural infrastructure utilising the climate proofing methods introduced by the project.
- Providing evidence of the long-term need for maintenance to safeguard infrastructure investments and assisting the government in identifying and prioritising financing, based on the principles of portfolio risk assessment (PRA) and associated cost-benefit analysis. Furthermore, the CBA tools to be developed by the project will be embedded in municipality as a standardised requirement for developing annual infrastructure investment plans.

87. Using the asset management database to be introduced in Activity 1.2, the project will develop essential processes for infrastructure asset management. These will include: maintaining a systematic record of individual assets (costs, original service life, remaining useful life, physical condition, repair and maintenance consistency); developing a defined program of planned maintenance of infrastructure including repair and replacement; and implementing and managing information systems (e.g., updating Geographic Information Systems on which the system will be based) based on surveys.

Operations and Maintenance

88. The annual and periodic maintenance cost for each of the 130 infrastructure units has been identified during project design process for 20-years of the infrastructure lifespan. Emergency maintenance which may be required to repair damage caused by unexpected events, by definition, cannot be forecasted and therefore has not been budgeted in annual O&M cost profile or implementation programmes. This will be considered in the investment planning to be undertaken based on risk-informed climate hazard information and will include contingency investment planning for such incidences, thus allowing for timely response to hazardous events to limit loss of access to infrastructure and limit the extent of the damages. The O&M strategy is detailed in the O&M annex (Annex XIII (b)).

89. To ensure sustainability of O&M, the project will strengthen the technical, financial and institutional capacity for the O&M mechanisms of rural infrastructure. To this end, the project will embed the capacity to identify and address current and future requirements for maintenance by developing and embedding, asset management system, tools and approaches, including regular asset condition inspection mechanisms and damage and loss accounting. Under Activity 1.2 and 1.3 the project is developing essential processes for infrastructure asset management including, maintaining a systematic record of individual assets (costs, original service life, remaining useful life, physical condition, repair and maintenance consistency); developing a defined program of planned maintenance of infrastructure including repair and replacement; and implementing and managing asset information systems as well as portfolio risk management methods that ensure the systematic prioritisation of the maintenance costs of each infrastructure unit.

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32 Please see individual infrastructure unit tabs in excel spreadsheets XIII (h) 2-5, Ranking tab of excel file Xiii (h) 1 and the tables in O&M Plan Annex XIII (b), for the profile of maintenance costs for each infrastructure unit over 20 years.
infrastructure unit for the lifespan of the unit. Such systematized asset management practice will enable effective planning and costing of climate proofing measures, and, in particular, asset maintenance.

90. The project will also implement a strategy for the harmonisation of the PDIM and PNDS infrastructure into a maintenance programme with regular budget allocated for maintenance, thus enhancing the service life of the infrastructure units. Building on improved institutional arrangements for O&M achieved under the SSRI project and the passing of Decree Law 3/2016, which embeds O&M responsibility under the respective Municipal Service with MSA having overall financing and implementation responsibility for small scale rural infrastructure O&M, the GCF project is supporting the ongoing decentralized investment framework which is administered through the PDIM and PNDS processes, by embedding the knowledge of climate risks and skills of climate proofing design, construction, operation and maintenance of rural infrastructure and embedding long-term operations and maintenance arrangements with local participation to ensure long term sustainability of infrastructure, service delivery and local governance.

91. Furthermore, with regards to long-term O&M financing, the project will embed financing models for investment maintenance costs (e.g. of community-based schemes that involve the use of tariffs or in-kind contributions to establish municipal maintenance programmes and will seek to engage private sector in infrastructure maintenance financing) using CBA approaches (being developed under Activity 1.2). It will use asset portfolio risk management approaches, in the identification and prioritization of long-term asset maintenance. Hence, the project is developing long-term infrastructure investment strategies which will help government to identify the infrastructure O&M needs and mechanisms for the long-term, which will include consideration of reduced O&M costs due to the climate proofing of infrastructure by this project. This comprehensive approach to O&M will ensure that the government would cover all O&M costs up to year 20 and beyond which will ensure the sustainability of O&M as a key and integral part of infrastructure climate proofing.

Activity 2.3. Supporting catchment management and rehabilitation measures to enhance climate resilient infrastructure and communities.

92. This activity will scale-up climate resilient catchment management in order to reduce the exposure of communities and their physical assets, such as rural infrastructure, to climate-induced hazards. Even with the climate proofing approaches to be introduced and implemented, it will still be necessary to implement catchment rehabilitation and management to re-establish proper catchment ecosystem functions in order to safeguard infrastructure and climate proofing investments from long-term climate change impacts. This will have the added benefit of reducing the cost of climate proofing and maintenance of infrastructure in the future. The project will assist MAF in utilizing climate risk information in their reforestation programmes (as part of project co-financing). Climate risk model and risk maps produced by the project will assist MAF in prioritization of catchments for rehabilitation, defining the methods of rehabilitation as well as geographic extend. Helping MAF to develop catchment re-forestation and agroforestry strategies that will include community engagement and training in forestry and agroforestry practices will lead to direct re-forestation of the catchments and improve livelihoods to the communities which ensure land use practices that contribute to overall risk reduction and long term climate resilience.

93. This project will be implemented via catchment management adaptation strategies (that include rehabilitation of hazardous areas through providing climate risk information) and actual on-the-ground methods for landscape restoration. The project will include landscape restoration, but will also employ the development of agroforestry strategies, including the community-based identification of appropriate climate resistant varieties of trees for planting in said restoration activities. Agroforestry and restoration ecosystem-based adaptation activities will be implemented at the catchment level.

94. More specifically, agro-forestry and reforestation activities refer to catchment management measures which will address wider catchment degradation which has led to increased flood, erosion and landslide risks which in turn threatens all infrastructure situated within the catchment. This intervention will assist MAF to develop their catchment agro-forestry and reforestation strategy based on climate risk information to be developed by the GCF project. The UNDP-GCF project will work with the Ministry of Agriculture and fisheries (MAF) and the National Directorate for Forestry and Agri-business (under MCIE) to develop catchment rehabilitation strategies including agro-forestry strategies for upstream catchments of target infrastructure. The project will develop strategies and actions for catchment rehabilitation, including selection of tree species, methods of rehabilitation and maintenance that are fully
95. GCF resources, combined with co-finance from the Ministry of Agriculture and fisheries (MAF) and the National Directorate for Forestry and Agri-business (which comes under MCIE) will be used to develop catchment rehabilitation strategies, including agroforestry, for catchments upstream of target infrastructure assets. The project will develop strategies and actions of catchment rehabilitation, including selection of tree species, methods of rehabilitation and maintenance that are fully informed by the climate hazard maps to be developed under Activity 1.1. The maps will delineate the priority hazardous areas for a phased rehabilitation strategy. This will assist in the identification of plant species that will provide the soil, water and nutrient protection properties needed to address degradation of catchments. Several varieties of tree species have already been identified, among them falcata moluccana, a fast-growth tree that is typically cultivated for timber; Acacia mangium that is increasingly being used for agroforestry projects for its nitrogen fixation properties, but also for shadow it creates for other trees, such as wild coffee. It is a resistant tree, and can be productive in low fertility soils with poor moisture content. Casurina and Toona Suren are also used for their timber and fast burning properties. Teak, mahogany, sandalwood and coconut have also been identified as climate resistant and with high livelihood value (see Annex II Feasibility Study for further details). The project will assist MAF and MCIE in developing a long-term strategy and plan for agroforestry as a catchment-wide ecosystem-based adaptation method. This will include identification of the most appropriate species for each municipality, based on the ability to address soil erosion and land degradation. The main benefit of this activity will be in its reduction of climate change impacts on the rural infrastructure of the 6 target districts. Other co-benefits include: gradual improvement of the geo-physical and hydrological condition of the catchment, reduced incidence of burning (slash and burn farming), promotion of the culture of planting and growing high value, climate resistant crops, provision of short and long term yet sustainable economic benefits to project beneficiaries, and the promotion of the creation of sustainable enterprise.

96. Actual catchment rehabilitation works will be conducted in the catchment areas that are particularly hazardous across the target districts. These areas will require reforestation in order to stabilize the soil, arrest erosion, and stem degradation that exposes the community and physical assets to climate change risks. The proposed catchment management works will involve convergence of existing government reforestation programmes with collective action by the community. MAF typically applies the community engagement methods in most of the reforestation schemes and the proposed project will also follow the same established practice. The project will support the MAF directorates on forestry and watershed management to undertake a phased approach to catchment rehabilitation while focusing on areas of high exposure to climate risk. Such climate risk informed prioritization will be based on hazard modelling and mapping of a range of climate change scenarios. Based on hazard risk information developed during the feasibility study, 200 hectares of state-owned land has been identified for reforestation/catchment management schemes. The project will work with the MAF to design and deliver this support to their existing reforestation and catchment management schemes in the 6 target municipalities which contain 19 sub-catchments in total. This is in line with MAF SDP (2011-2030) objective 3.4 which aims ‘To develop capacity for improved decision making in planning and budgeting processes by providing accurate and up-to-date climate information and analysis. As part of rehabilitation efforts agroforestry will be used as an important element of catchment management. The MAF forestry and MCIE agri-business experts will engage with community leaders to facilitate the formation of cooperatives for sustainable agroforestry.

97. At the local level, and based on the agroforestry strategies to be developed, the project will support farmers in identifying suitable community agroforestry opportunities. It will do this by identifying agriculture associations and cooperatives which will serve to facilitate individual members or groups in developing community-based agroforestry. These associations will also serve to provide technical and logistical guidance to farmers and will be organised by type of agroforestry (e.g. coconut growers association) and by geography (e.g. on an Administrative post level) to provide logistical support to farmers. In addition, these groups will include women's associations as well as youth.
organisations. The project will work with the MAF to design and deliver this support to their existing reforestation and catchment management schemes in the 6 target municipalities.

98. Furthermore, this activity will support rural communities to implement agroforestry on their lands and, in so doing, will enhance catchment management adaptation strategies. The main benefit of the catchment-based approach is that it addresses the livelihood pressures of communities within the catchments where key infrastructure is being developed, and at the same time helps to protect the infrastructure from climate-induced hazards through the re-establishment of critical ecosystem functions. Based on the 10 sucos with the highest vulnerability to soil erosion in the 6 target municipalities, it is estimated that 23,412 households face potential crop losses due to erosion (a total loss of $1.9 Million USD). GCF funds will be used to generate climate risk information at appropriate scale to support MAF in designing and delivering the reforestation and catchment management schemes both on public and farm lands. MAF co-financing will be used to implement reforestation, covering the labour cost, attendance and maintenance in order to increase the survival rate of the planted stands. MAF will also mobilize local communities and engage with local vulnerable farmers in the target municipalities to promote and support multiplication of seedlings for agroforestry.

99. Assuming agroforestry will be promoted in areas such as these, the potential number of beneficiary households is 24,312. It is estimated that approximately 100 ha of privately-owned land belonging to these climate vulnerable households currently under threat from land degradation. Community implementation models have been used before and consultancies were undertaken for the project to ensure community buy-in (See Annex XIII d-1 – Stakeholder Consultation). This will be used to establish agroforestry within the target, priority sub-catchments. The hectares of land to be rehabilitated has been calculated based on number of households currently at risk from erosion and likely to be losing crop yields because of the combined effect of catchment degradation and climate change exacerbated hazard risks. The best proven approach is to target communities and incentivise them to engage in agroforestry (i.e. such households are likely to engage as they currently have a problem with loss of crops due to intensified hazards and degradation of their land). The communities thus identified will be supported to implement climate resilient livelihoods that are conducive to resilient catchment management and climate risk reduction.

C.4. Background Information on Project / Programme Sponsor (Executing Entity)

100. The main project sponsor is the Ministry of Commerce, Industry and Environment (MCIE). The MCIE mandate gives it the responsibility for environment and climate change related policies, legislation and program/project implementation. The MCIE, and more specifically the National Directorate for Climate Change (NDCC), will be the project implementing partner. In addition, the Ministry of State Administration (MSA), Ministry of Social Solidarity (MSS) and Ministry of Agriculture and Fisheries (MAF) will serve as additional responsible parties.

101. The project is implemented in line with established Government of Timor Leste and UNDP procedures in Timor Leste. The Ministry of Commerce, Industry and Environment will take overall responsibility for implementation and success of the project. They will establish necessary planning and management mechanisms to oversee project inputs, activities and outputs. The project formulation process will be used to further define management, coordination and consultation mechanisms. A variety of stakeholders will be involved in all stages of project development and implementation, including the validation of project activities, preparation of project outputs, and participation in trainings. Activities will be implemented to involve as many and as diverse stakeholders as possible.

102. The 2015-2019 Country Programme has a resource envelope of $74,959,000 USD. Based on Country Programme focal areas, resources are distributed as follows: Resilience Building (22%); Inclusive and sustainable development (43%); and Democratic governance (35%). In the last four years (2013-2016), the average of country office delivery is 10.5 Million. Key staff from the UNDP country office that will support programme development and its implementation include: Leadership: UN Resident Coordinator and UNDP Resident Representative (1), Country Director (1) Operations Manager (1), Programme: Assistant Country Director/Head of programme Unit (3) Communication Analyst/Head of Communication and Management Support Unit (1); Operations: Head of HR/HR Analyst (1) Head of Finance/Finance Analyst (1), Head of Procurement/Procurement Analyst (1) Head of ICT/ICT Analyst (1), Common Premises Manager (1), Field Security Associate (1).

33 The NDCC was formerly known as the National Directorate for International Environment and Climate Change (NDIEACC).
C.5. Market Overview (if applicable)

103. Agriculture dominates economic activities in Timor Leste (IV Constitutional Government Program, 2007-2012). It is subsistence agriculture with low inputs and outputs, and comprises crops and livestock, fisheries and forestry. It is estimated to employ more than 75% of Timorese people. Staple crops are maize, rice, and cassava with sweet potato, potato, mung bean, peanut and soya bean being widely grown in farmlands on steep slopes. The exception to this is the rice crop, which is mostly found on flat areas or terraces on moderate slopes. Cash tree crops such as coffee, coconut and candlenut are important and are grown on specific slopes and bands of elevations. For example, coffee plants are found in cool high elevation areas in some districts such as Ermera, Aileu and Ainaro, while coconut plants are found in the coastal areas of some districts such as Baucau and Viqueque. Low agricultural production combined with a lack of access to markets and inputs contributes to high food insecurity, particularly in rural areas where 74 percent of the rural population suffers moderate and severe food insecurity. Annual food deficits also contribute to malnutrition rates, especially for children and women, which have been among the highest in the world.

104. Despite the heavy reliance on agriculture for subsistence and for income generation, there is a lack rural infrastructure to support agricultural productivity including access to markets and what infrastructure exists is at increasing risk of damage from intensifying climatic hazards. An ADB study on least developed sucos (villages) measured the living standards across the country against the asset index. The sucos with highest living standards are concentrated around the capital Dili and close to district centres. Sucos with the lowest living standards are the most remote and have small population. Access to infrastructure is higher in sucos with higher living standards, and there is a large gap in access between groups. For example, of the 89 sucos with the lowest living standards, the average share of households with electricity is only 3%. This compares with an average share of 66% in the 89 sucos with the highest living standards. Access to improved water and improved sanitation is also much higher in sucos with high living standards.

105. The project is using agroforestry as a strategy to improve catchment management practice and stabilize the land. Deforested and degraded watersheds significantly exacerbate disaster risks and associated risks of physical damage and economic losses to the communities and their physical and economic assets, such as essential rural infrastructure. Potential of such a strategy is enormous in Timor Leste. Over 30% of its land area is under-utilized and is suitable for tree growing. Demand on food and timber products are growing fast both in the region and globally.

106. FAO (2010) reports that 264 million ha of trees were planted by 2010 for both productive purposes (timber, pulpwood, biofuel) and protection purposes (carbon, soil erosion, water regulation). These areas span a continuum of situations in terms of ownership, species richness, and intensity of management. For the 10 years leading up to 2010, the annual increase in planted forests was 5M ha annually, globally. FAO further suggests that to provide for future world food and wood needs, an additional 100 million hectares of managed plantation forests will be required. It seems clear that the role of forest plantations as source of food and wood products will continue to increase.

107. In Timor Leste today, nearly all urban and rural households use fuelwood for cooking. This predominance of fuelwood in the national energy mix is expected to continue in the foreseeable future, a consequence of the highly rural nature of the economy and the general poverty of the population. In 2006, the World Bank (2007) estimated that total annual fuelwood use in Timor Leste was 600,000 tonnes, representing an average household consumption of 4.3 tonnes/household/annum. As part of this study, fuelwood (Eucalyptus alba in 2.5 kg bundles) was purchased in the Dili market for a notional selling price of US$0.37/kg. If all the fuelwood consumed in Timor Leste was monetarised, the value of fuelwood consumed annually is currently about US$220 Million USD. Current wood harvest and primary processing practices using chainsaws are extremely wasteful and inefficient, capturing only an estimated 15% of the volume grown. Timor Leste needs to improve wood processing efficiency and encourage the private sector to invest and become actively involved in establishing, harvesting and processing domestically-grown forest trees for local use and for export. GCF investment will be the first such targeted effort to facilitate the community-led and development in the sector of agroforestry.

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108. Based on the geomorphological condition of the target sites the proposed design of the Agroforestry intervention is a Agri-Silvicultural System (ASS). This design has three major components: Multi-Purpose Trees (MPTs), Cash-Crops (CCs) and Fruit Bearing Trees (FBTs).

109. MPTs will be planted as hedgerows to address soil erosion and control waterflow. The MPTs will also serve as local source of natural fertilizer, main ingredients of natural pesticides and insecticides and alternative fuel wood source. Leaves of MPTs are also excellent feed source for poultry and livestock. CCs will be the immediate source of income of the project beneficiaries while waiting for the main crop (FBTs) to grow and become productive. The CCs will be cultivated along the alleys in between the hedgerows of MPTs. Any CCs that will thrive on the alleys can be grown if it will not lead to further land degradation. The project beneficiaries who will engage in agroforestry will also agree on the type of CCs they will produce simultaneously each planting season to increase the volume of production and facilitate transport and marketing of their produce. FBTs are the main crop of the proposed Agroforestry intervention. The species were selected based on the most commonly available and widely grown species in the municipalities. The FBTs will also serve as a deterrent that will discourage the common practice of burning for land clearing prior to agricultural cultivation. The intervention will also serve as a precursor in the development of a culture of planting and caring for trees alike among the project stakeholders.

MPTs

110. Ai-gamal and Lamtoro (Leucaena leucocephala) are two species highly recommended to serve as MPTs for the Agroforestry Intervention. These species are widely and locally available in Timor Leste. Farmers plant this species as live-fence, living-post for barbed-wire fence, and farm hedgerows for SWC measure and alley cropping. These species can grow in any type of soil. Ai-Gamal can thrive up to 1600 m elevation and Lamtoro up to a maximum of 2,100 m.

CCs

111. Timor Leste farmers are very innovative and can grow any crop even in thin-layered problematic soil. The selection of CCs that will be grown will depend of the agreement between and among farmers who will engage in the Agroforestry intervention because they are more familiar and knowledgeable of the condition of the target sites and are more experienced. They will also receive technical assistance to help them make decisions.

FBTs

112. The list of FBTs in the table below also shows the site requirement for each species. This will be the principal basis in making the final selection.

113. Despite knowing that project beneficiaries will not immediately reap the full benefits from planting FBTs, Municipal key officials are still very optimistic and are fully convinced that Agroforestry will not only provide sustainable income but will also improve the economy of the municipality. The table below shows the list recommended FBTs, the specific site requirements to achieve optimal production and their Return on Investment (ROI).
114. The main adaptation benefits of agro-forestry will be as follows: Agroforestry is an intervention where farmers produce or grow different crops by combining and mixing them simultaneously or sequentially. Hence, every inch of the farm is utilized. The crops grown are complementing each other. Hedgerows protect the cash crops from erosion, provides a source of organic fertilizer and ingredient for natural pesticides. Growing FBTs or main crops will also benefit from the production and maintenance of CCs. MPTs can also protect the main crops if utilized as shade trees.

115. Family members, especially children and girls who are usually tasked to gather firewood need not to walk far and look for places to collect since the MPTs can already supply their requirement. The family may decide also not to free graze their livestock and poultry because they can use as animal feed the young leaves and small branches of MPTs and agricultural waste from their farm. Women will be more engaged in harvesting, cleaning, sorting and marketing fruits when the FBTs become productive. In short members of the family will share the responsibilities in tending the farm.

116. Based on the socio-economic profile of potential beneficiaries half of the family members consist of woman and almost a quarter are headed by them. Hence, the likelihood those women, young and adult, will also have a big role in running the farm as an enterprise.

117. Key climate change adaptation benefits of agro-forestry include: reduce soil erosion and land degradation, improve gradually the geo-physical condition of the catchment, reduce incidence of burning (slash and burn farming), promote the culture of planting and growing high value crops, provide short and long term yet sustainable economic benefits to project beneficiaries and promote the creation of sustainable enterprise, ultimately reduce the impact of climate change on infrastructure, increased flood security.

C.6. Regulation, Taxation and Insurance (if applicable)

118. Any licenses or permits required for the implementation of the project will follow the established policies and processes by the government.

119. **Tax Considerations for UN-supported Projects**: UN-supported projects are currently tax-exempt in Timor Leste.

120. **Foreign Exchange and Insurance Policies**: UNDP’s currency hedging policy is based on the use of natural hedges (matching cash flows (i.e. revenues and expenses) in non-USD currencies) to the extent possible. UNDP Country Office bank account balances are managed not to exceed approximately one month’s disbursement requirements to minimize risk.

121. The Government signed a Standard Basic Assistance Agreement (SBAA) with UNDP in 2002. Consistent with the SBAA, the responsibility for the safety and security of the Implementing Partner (executing entity) and its personnel and property, and of UNDP’s property in the Implementing Partner’s custody, rests with the Implementing Partner (executing entity).

C.7. Institutional / Implementation Arrangements

122. The project will be implemented following UNDP’s National Implementation Modality (NIM), according to the Standard Basic Assistance Agreement between UNDP and Government of Timor Leste, the Country Programme Action Plan (CPAP), and as policies and procedures outlined in the UNDP POPP. (see: [https://popp.undp.org/SitePages/POPPSubject.aspx?SBJID=245&Menu=BusinessUnit](https://popp.undp.org/SitePages/POPPSubject.aspx?SBJID=245&Menu=BusinessUnit)).

123. The national executing entity - also referred to as the national ‘Implementing Partner’ in UNDP terminology - is required to implement the project in compliance with UNDP rules and regulations, policies and procedures, including the NIM Guidelines. These include relevant requirements on fiduciary, procurement, environmental and social safeguards, and other performance standards. In legal terms, this is ensured through the national government’s signature of the UNDP Standard Basic Assistance Agreement (SBAA), together with a UNDP project document which will be signed by the Implementing Partner to govern the use of the funds. The (national)
Implementing Partner for this project will be the Ministry of Commerce, Industry and Environment (MCIE) accountable to UNDP for managing the project, including monitoring and evaluation of project interventions, achieving project outcomes, and for the effective use of UNDP resources.

**Contracts and flow of funds**

124. MCIE is also the National Designated Authority of the Green Climate Fund and all the national level coordination mechanisms will be under the aegis of the ministry. The Ministry of State Administration – MSA, responsible for municipal and village investment programmes (PDIM and PNDS); Ministry of Social Solidarity – MSS, responsible for disaster risk reduction policies and actions; and Ministry of Agriculture, Forestry and Fisheries – MAF, responsible for reforestation policies and actions, will take the roles of Responsible Parties under the respective project activities, following their mandates. Under the National Implementation Modality, and in terms of the Project Document to be signed between UNDP and GOTL (Subsidiary Agreement under the FAA), UNDP will advance cash funds on a quarterly basis to the MCIE as EE. The major agreements to be entered into are those between the MCIE and:

- The Ministry of State Administration;
- The Ministry of Social Solidarity; and
- The Ministry of Agriculture, Fisheries and Forestry.

As the AE, UNDP will disburse funding (received from the GCF according to the FAA disbursement schedule), to the Ministry of Commerce, Industry and Environment (MCIE), as the Executing Entity, for the purposes of undertaking the project. The MCIE will conclude agreements with the three Ministries that will be made Responsible Parties (RPs), responsible for delivering particular projects activities following their institutional mandates (these will be detailed during the formulation of the project document).

**Flow of funds:**

125. In addition, the Government of Timor Leste has requested UNDP to provide direct project services for this project. These services cover both technical and administrative support and are specified in the draft Letter of Agreement. The direct project services follow UNDP policies on the recovery of direct project costs relating to GCF funded projects.
126. The Project Board is comprised of the following organizations: Ministry of Commerce Industry and Environment (MCIE), Ministry of State Administration (MSA), Ministry of Social Solidarity (MSS), Ministry of Agriculture and Fisheries (MAF), Ministry of Public Works (MPW) and UNDP. The Project Board is responsible for making, by consensus, management decisions when guidance is required by the National Project Director and the board will approve annual project budget and work plans required for the implementation of the project. Project Board decisions will be made in accordance with standards that shall ensure management for development results, best value money, fairness, integrity, transparency and effective international competition. In case a consensus cannot be reached within the Board, final decision shall rest with the UNDP senior representative, as per the UNDP POPP. The Project Board will meet every six months.

- An Executive (role represented by National Implementing Partner) that holds the project ownership and chairs the Board. The Executive will be a Senior Representative from MCIE.
- A Senior Supplier representative providing guidance regarding the technical feasibility of the project, compliance with donor requirements, and rules pertaining to use of project resources. This role will be fulfilled by UNDP in its capacity as GCF Accredited Entity;
- Senior Beneficiary representatives who ensures the realization of project benefits from the perspective of project beneficiaries; and
- The National Project Director, a Focal Point from the MCIE who is responsible for overall direction, strategic guidance, and timely delivery of project outputs.

127. The National Project Director will oversee the implementation on behalf of and as a representative of the Sponsor (MCIE) and according to the agreed workplan, guided by the Project Board. The National Project Director function
will end when the final project terminal evaluation report, and other documentation required by the GCF and UNDP, has been completed and submitted to UNDP. The National Project Director is responsible for providing strategic guidance and decision-making for the project. The National Project Director’s prime responsibility is to provide strategic guidance and support to the Project Manager in ensuring that the project produces the results specified in the project document, to the required standard of quality and within the specified constraints of time and cost.

128. The Chief Technical Advisor (CTA) will provide regular technical guidance to the project management and technical teams in managerial and technical issues. He/she will be hired long-term for the duration of the entire project implementation period by UNDP, based on UNDP recruitment procedures.

129. The Project Manager (PM) will lead the Project Implementation Unit and run the project on a day-to-day basis on behalf of the MCIE within the constraints laid down by the Project Board. The Project Manager function will end when the final project terminal evaluation report, and other documentation required by the GCF and UNDP, has been completed and submitted to UNDP. The Project Manager is responsible for providing strategic guidance and decision-making for the project. The Project Manager’s prime responsibility is to ensure that the project produces the results specified in the project document, to the required standard of quality and within the specified constraints of time and cost. The PM will be a local staff contracted by UNDP and located at MCIE. Both Project Manager and National Project Director will both be represented in the Project Board.

130. Project Support: The PM will be supported by a core team of technical and support staff forming the Project Implementation Unit (PIU). The PIU will be located at the MSA to execute project activities, including day-to-day operations of the project, and the overall operational and financial management and reporting (the PIU will include a finance and administrative officer and monitoring and evaluation officer). For the project’s technical support, a Technical Committee comprised of key relevant government departments and technical partners (Civil Society Organizations, academia, interest groups and associations on the ground) will be established and will work closely with the central Project Management Unit, with the mandate to vet the project deliverables and provide technical inputs and validation. In addition to the Technical Committee, a separate donor coordination group will be set up to ensure there are synergies and coordination and that a scale up strategy is enforced through multiple programmes and investments. At the municipal level, the project will require Field coordinators for each target municipality to localize the project plans and synchronize work planning and implementation with overall coordination by the National Project Coordinator, and supported by the Project Manager and CTA.

131. UNDP provides a three-tier oversight and quality assurance role involving UNDP staff in Country Offices and at regional and headquarters levels. The quality assurance role supports the Project Board by carrying out objective and independent project oversight and monitoring functions. This role ensures appropriate project management milestones are managed and completed. Project Assurance must be independent of the Project Management function; the Project Board cannot delegate any of its quality assurance responsibilities to the Project Manager. The project assurance role is covered by the accredited entity fee provided by the GCF. As an Accredited Entity to the GCF, UNDP is required to deliver GCF-specific oversight and quality assurance services including: (i) Day-to-day oversight supervision, (ii) Oversight of project completion, and (iii) Oversight of project reporting.

C.8. Timetable of Project/Programme Implementation

Please see Annex X for an indicative timetable of project implementation.
### D.1. Value Added for GCF Involvement

132. Without GCF involvement, the government of Timor Leste will not be able to absorb the additional cost of adaptation into its ongoing investments into small-scale rural infrastructure services. Although economic growth performance has been positive during the past decade of the country’s 12-year existence, capacity constraints persist. Without GCF investment, vulnerable communities (mainly engaged in small-holder farming) will continue to be susceptible to climate change impacts that they have limited coping mechanisms to withstand. Therefore, GCF support is critical to address the main identified barriers inhibiting climate resilient local infrastructure. Through direct investment in climate resilient engineering solutions and enabling sustainable policies and practices and ecosystem-based methods of catchment management, GCF funds will increase the long-term resilience of decentralized infrastructure services.

133. Gaps in key rural infrastructure services not only prevent the successful adaptation of vulnerable communities, but also limit the potential for local economic and social development. This points to the need for last mile investments to meet the needs of these isolated communities and the safeguarding of those investments against climate change-induced hazards. Therefore, small-scale village infrastructure services have been invested in through local district / municipal and village investment plans, but these funds presently cannot absorb incremental cost of climate change impacts. The GCF efforts to strengthen capacities and create enabling conditions will mobilize additional funding to secure these assets. GCF investment in climate proofing and community resilience will catalyse public and private investment towards climate resilient development of vulnerable communities and their community assets. In addition, GCF will provide additional district / municipal and village level investments that will allow scaling up existing efforts for transformative change and impact across the country.

### D.2. Exit Strategy

134. The project’s sustainability and exit strategy is rooted in the key elements of design and implementation. The following assures long-term sustainability beyond the project implementation period:

135. **Investment in human resources and institutions:** The project is focused on developing knowledge institutions that have skilled human resources as well as adequate information, tools and technologies to effectively pursue their mandate in climate risk management. Project investments will improve the availability of risk information and create effective response mechanisms. The project will help all relevant institutions develop and implement comprehensive short- to long-term personnel learning and training programs at all scales - including community, Administrative Post (AP), municipality and national levels. All these programmes will be integrated into existing education and training systems and will become routine after the end of the project. This approach to capacity development is far reaching and more likely to ensure sustainability, and continued growth, of improved human resource and technical capacities. To address sustainability of institutional capacities advanced as part of the project, the project will support the development and adoption of relevant legal frameworks, policies and planning frameworks for climate resilient infrastructure development. In addition, as part of the exit strategy, the project will address the legal frameworks, policies, and processes which currently present barriers to the climate resilient provision of decentralized infrastructure services in Timor Leste. Through enhancements to the legislative and institutional framework, the project will ensure that the required systems/mechanisms for accountability, transparency, and technical knowledge transfer for decentralized climate resilient infrastructure development are in place for the long-term.

136. Most importantly, cost-benefit assessment methodologies and a socio-economic risk model will be embedded into the planning processes for the Integrated Municipal Development Planning (PDIM) and National Village Development (PNDS) programmes as a result of the project (Output 1). These will ensure that financial and economic resources are available after GCF assistance ends for the government to better analyse climate risks associated with the provision of decentralised infrastructure services at the municipal and village level, identify and finance cost-effective climate risk reduction measures, and maintain infrastructure investments over time. The cost-benefit modelling initiated as part of this effort will be used to support efficient use of financing.

137. **Investment in social and economic assets of vulnerable communities:** The damaging effects of extreme events and changes in weather patterns exacerbated by climate change will unravel the potential for socioeconomic
development in vulnerable and isolated communities. However, investing in small-scale infrastructure in a way that is resilient to such climate change impacts can help reduce the vulnerability of these areas. Infrastructure that is "climate proofed" will have structural stability and functional longevity in the face of climate changes. The reliability of infrastructure such as roads, bridges, and pipes will, in turn, help secure essential services such as water supply, irrigation, mobility, and access to services. In addition, infrastructure built to standards that account for predicted climate impacts will provide protection against the multiple hazards that dominate the country’s hazard profile (floods, flash floods, landslides, storms). This project seeks to strengthen PIDM and PNDS investment planning and implementation cycles by embedding climate risk information and enhancing the capacity to prioritize, budget, locate and deploy infrastructure that is functionally stable in the face of climate hazards. This will help ensure the financial sustainability of infrastructure climate proofing efforts for the long-term. In addition, this will provide the potential to mobilise financing to absorb the additional cost of climate proofing in the future, through municipal and private sector finance mechanisms.

138. **Investment in natural capital**: The functional capacity of the landscape plays an essential role in maintaining long-term resilience and safeguarding investments and communities against climate-induced disasters and slow onset changes in weather patterns, especially in an island community of complex and harsh terrain. For example, stable adjacent slopes and healthy watersheds will keep the cost of climate-proofing infrastructure proposed above within a manageable range. Thus, it is critical for the project to take a broader climate risk reduction approach that also accounts for, and promotes the maintenance of, the ecosystem services provided by the natural environment in the project areas. Natural landscapes can provide protective services and reduce the need for additional infrastructure dedicated to climate protection, such as sea defences or flood walls, interconnections in water supply, or retrofitting of all existing infrastructure units. Fostering an environment of stable and well-managed natural capital is an investment in the long-term sustainability of social and economic assets, such as those that the GCF project will fund in Timor Leste.

139. **Post-project O&M**: In addition to protecting investments via maintaining the natural surroundings, the government cofinancing supporting district / municipal and village investment mechanisms will also include budgeted O&M costs for a period well beyond the project duration. Local customary land use laws (tara bandu) and traditions will be used as well as locally defined roles and responsibilities for control, protection and maintenance to sustain the GCF investments.

140. In terms of maintenance of infrastructure, MSA is committed to provide O&M to 130 infrastructure units to be implemented by the project, during and after the end of the project (please refer to MSA’s co-funding letter, (Annex IV)). Furthermore, the implemented infrastructure units will be integrated into the existing rural infrastructure asset network to be operated and maintained by relevant line ministry practitioners sitting under MSA at the municipal level. (please refer to O&M plan Annex XIII (b).

141. In addition, the project will assist relevant government institutions in developing long-term O&M financial planning to ensure that infrastructure, equipment and systems implemented under the project will be maintained in the long-term. The project interventions have been designed to strengthen financing and implementation of O&M in the long-term. To this end, the project will address current and future requirements for maintenance by developing and embedding CBA, asset management and portfolio risk management methods that ensure the systematic identification and prioritisation of the maintenance costs over the lifespan of the infrastructure units. Recognising that O&M is integral to climate proofing of infrastructure, the project will also implement a strategy for the harmonisation of the PDIM and PNDS infrastructure into a maintenance programme with regular budget allocated for maintenance, thus enhancing the service life of the infrastructure units.
### E.1. Impact Potential
Potential of the project/programme to contribute to the achievement of the Fund’s objectives and result areas

#### E.1.1. Mitigation / adaptation impact potential

143. The project targets the districts of Timor Leste that are among the most vulnerable in terms of poverty indices, infrastructure deficits, gaps in basic public services and social vulnerabilities, and high levels of community exposure to climate induced disasters. Selected rural districts encompass a diversity of terrains, including mountainous zones, river valleys, and coastal areas. Likewise, the local conditions for small-scale rural infrastructure and community development are varying. Under Output 2, the total number of direct beneficiaries will reach approximately 175,840 people directly benefitting from the proposed climate resilient rural infrastructure projects. Approximately 208,367 people and some 300 ha of land will benefit from agroforestry and reforestation activities. The main areas of adaptation impact include: (i) increased resilience of infrastructure and the built environment to climate change threats (GCF result #3). At least $25.66 million USD (including $12.5 Million government co-financing) worth of small-scale rural infrastructure - approximately 130 units (47 slope stabilization projects (216.94 km); 38 enhanced water supply systems; 25 improved irrigation systems (54.18km); 20 flood defenses (14.15 km)) - will be made more resilient to climate variability and climate change. Furthermore, 300 ha of land will be under a combination of agroforestry, reforestation and catchment management measures.

144. The project will increase resilience and enhance livelihoods of the most vulnerable segments of population, particularly women, children and the elderly. Physical damage and economic losses due to impacts of extreme climate related disasters will decrease by at least half (calculated against base line Damage and Loss)\(^{37}\). Nationally, economic losses from extreme hazards range from $203 Million, $37 Million, $10 Million and $12.5 Million USD for landslides, floods, erosion and drought respectively for the whole of Timor Leste. This is a considerable financial burden and development setback for a low-income country with a heavy dependence on subsistence agriculture. Through the development of climate risk information, inclusion of such information and improved DRM systems and climate change adaptation in the long-term, the project will help reduce these levels of economic damages.

145. In the 6 target municipalities climate-induced hazards currently have the following impacts on people, infrastructure and agriculture\(^{38}\):

- **Dwellings** (number of homes affected): 14,663 homes affected by floods; 87,139 homes affected by drought; 75,819 homes affected by erosion; 84,853 homes affected by landslides
- **Water supply sources** (Number of homes at risk from impacts on water sources): 66,027 homes at risk from floods; 76,049 homes at risk from drought; 76,049 homes at risk from erosion; 75,186 homes at risk from landslides
- **Rural roads** (length of rural roads impacted): 323.69 km impacted by floods; 2,143 km impacted by landslides
- **Agriculture** (numbers of hectares affected): 40,598ha affected by landslides; 15,785ha affected by floods; 40,598ha affected by erosion; 40,598ha affected by drought

146. The 20 flood control projects identified will have the effect of averting $37,000 USD in annual economic damages in the target communities, impacting 11,338 beneficiaries and protecting 109 ha of land from flooding. The 47 road slope stabilization sites will increase access to markets and other services for 92,397 beneficiaries and will substantially increase their economic activity from current values of $1.68 million USD combined. The 38 water supply projects identified will reach 21,973 beneficiaries with a combined income of $1.2 Million USD. The 25 irrigation schemes will reach 50,246 beneficiaries and will enhance income from crops, currently a value of $428,485 USD.

147. The impact potential of climate proofing critical small-scale rural infrastructure is high as it will safeguard vulnerable communities and their economic assets from climate change-induced disasters. In addition, livelihoods of

\(^{37}\) See Section 2.9 of the Feasibility Study for the detail socio-economic risk assessment

\(^{38}\) Details of the socio-economic risk assessment on which figures are based, can be found in Chapter 2 of the feasibility report
communities will be enhanced through agroforestry which, in combination with reforestation and catchment management measures, will reduce land degradation on 300 ha of land, impacting 208,367 beneficiaries. A further 1200 ha of land within project areas will be rehabilitated through MAF co-financing.

148. It is expected that the proposed project adaptation interventions, will provide essential climate resilient infrastructure to the most vulnerable, enable them to participate more effectively in a productive society and providing access to essential clean water (through water supply infrastructure), transportation (through road and bridge construction and rehabilitation), increased crop productivity (through irrigation infrastructure), and flood defenses resulting in better health and socio-economic development and protection of people, property and community assets from floods, landslide and erosion risks. The needs of disabled and vulnerable people will be considered throughout the project in terms of policies and regulations, design of infrastructure, capacity building of decision makers, and implementation, including employment opportunities. For example, Activity 1.3 involves the revision of regulations, standards and specifications for climate proofed infrastructure, such revision will include consideration of the needs of disabled and vulnerable people.

149. The project design has been informed through consultation with various stakeholders and has sought to reflect the gender differentiated aspects of climate risks. Information on the needs of vulnerable groups (women, ethnic minorities, disabled, elderly) has been collected and will continue to be collected through ongoing and inclusive stakeholder engagement. Through a Gender Action Plan (GAP), which addresses the needs of not only women and other vulnerable groups, concrete actions will assist in fulfilling Timor Leste’s commitment to gender equity and international obligations on gender responsive climate change and disaster risk measures. The GAP will draw on lessons learnt from the UNDP SSRI project include the need for gender responsive planning and implementation. It will include gender analysis as part of risk and vulnerability and support capacity building of staff and implementing partners to collect sex and age disaggregated baseline data; develop specific performance indicators to monitor, report or track progress, inform decision; and strengthen accountability on commitments for gender equality. For example, the project will seek to mainstream gender in the PDIM to ensure women’s involvement in all stages of the process:

- Planning: Take women’s opinion, experience, skills and knowledge in developing the strategic plan and PDIM projects
- Design: Prioritize and ensure women participation in all stages from project planning to implementation; ensure provision enhance the women’s capacity.
- Implementation of projects: Ensure women’s participation in implementing projects in rural areas
- Monitoring & Evaluation: Balance participation to make M&E more effective

E.1.2. Key impact potential indicator

<table>
<thead>
<tr>
<th>Expected tonnes of carbon dioxide equivalent (t CO₂ eq) to be reduced or avoided (Mitigation only)</th>
<th>Annual</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lifetime</td>
<td>N/A</td>
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<tr>
<th>GCF core indicators</th>
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<tbody>
<tr>
<td><strong>Expected total number of direct and indirect beneficiaries, disaggregated by gender (reduced vulnerability or increased resilience);</strong></td>
<td></td>
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<tr>
<td><strong>Number of beneficiaries relative to total population, disaggregated by gender (adaptation only)</strong></td>
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<tr>
<td><strong>Total</strong></td>
<td>Direct Beneficiaries - 175,840 (89,643 males, 86,197 females), 19,751 households</td>
<td></td>
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<tr>
<td><strong>Total Beneficiaries (direct and indirect)</strong></td>
<td>– Total population in the six target districts of Baucau, Ermera, Aileu, Viqueque, Lautem and Liquica -</td>
<td></td>
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</tr>
</tbody>
</table>

39 All these figures are based on the socio-economic risk modelling undertaken for the formulation, as part of feasibility study.
### Other relevant indicators

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Number and value of physical assets made more resilient to climate variability and change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Target:</strong></td>
<td>130 infrastructure units (47 Road slope stabilization projects (216.94 km); 38 Water Supply Systems; 25 Irrigation systems (54.18km); 20 flood defenses (14.15 km)) for a total value $25.68 Million USD</td>
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<table>
<thead>
<tr>
<th>Indicator</th>
<th>Increase in generation and use of climate information in decision-making</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Target:</strong></td>
<td>Climate hazard and risk information for 4 of the main hazards (floods, landslides, erosion and droughts) facing Timor Leste</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Total area of degraded land rehabilitated and protected from erosion, landslide and flood risk from climate variability and change, benefitting infrastructure and improving livelihoods</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Target:</strong></td>
<td>300 ha of land with agroforestry (100 has reforested state lands, 100 ha agroforestry on state lands, and 100 ha of agroforestry on private land). 23,412 households with improved livelihoods through implementation of agroforestry. A further 1200ha of reforestation and agroforestry from MAF co-financing.</td>
</tr>
</tbody>
</table>

150. Total number of beneficiaries and reduced annual economic losses under baseline and CC scenarios were calculated during the feasibility study using existing indicative hazard mapping, socio-economic datasets available for all of Timor Leste (official statistics of the 2017 Census), and a GIS-based socio-economic risk model that was developed for the feasibility study. To calculate the number of beneficiaries for rural roads, GIS techniques were used to derive “catchment” areas of beneficiaries. The risk map layers were used to first identify whether the road falls within the High-Risk Category and then using a buffer distance of 5K the household beneficiaries were determined based on the 2015 census. For flood projects, the location of the proposed projects was identified using Google Earth imagery to digitise polygons of beneficiary areas and combined with the Flood Risk Map, the number of location of households counted if they fall within the High-Risk Category. Again, using the 2015 census the number of beneficiaries was determined. If the project is meant to benefit the whole community, the total household and population of the said community was used. For irrigation schemes, beneficiaries were calculated based on households and population of the Irrigation Service Areas along the length of the proposed irrigation scheme. For water supply projects, beneficiaries were calculated based on the Service Area (Suco) Households Population for each scheme. It should be noted that the population groups benefited by individual infrastructure works do not overlap, as each suco (village) only receives 1 infrastructure unit and the beneficiaries have been calculated based on number of beneficiary households in the suco in which the infrastructure unit is being implemented. With linear infrastructure such as roads, flood defences and irrigation channels connecting sucos in different aldeias, the suco names are repeated as start and/or end points of the infrastructure, but beneficiary households are different.

151. GIS data on people, property and agricultural land enabled the enumeration and, in some cases, the quantification of the impact of the 4 main hydro-meteorological hazards. The analysis considered the baseline scenario and a climate change projection. Findings of GIS-based socio-economic risk mapping (e.g. vulnerable regions, population affected, infrastructure, property, and agricultural land damaged and related economic losses) form the basis of the calculations.

152. The sub-catchments within which priority infrastructure units are located have been identified. These priority sub-catchments delineate the land area that requires ecosystem rehabilitation work through via reforestation, mainly by

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40 See Annex 7 to the Feasibility Study – detailed list of infrastructure beneficiary sucos by municipality
use of locally-appropriate planting and agroforestry activities. The hectares of land to be rehabilitated has been calculated based on number of households currently at risk from erosion within the infrastructure sub-catchments and who are currently likely to be losing crop yields because of the combined effect of catchment degradation and climate change exacerbated hazard risks. The best proven approach is to target communities and incentivize them to engage in agroforestry (i.e. such households are likely to engage as they currently have a problem with loss of crops due to intensified hazards and degradation of their land). The communities thus identified will be supported to implement climate resilient livelihoods that are conducive to resilient catchment management and climate risk reduction. Total targeted land area thus amounts to 300 ha. This is made up of 100ha of private land on which agroforestry will be implemented by individual households, 100ha of state land on which agroforestry will be implemented with the help of communities, and 100ha of state land on which re-forestation will be implemented. A further 1200ha of reforestation and agroforestry is planned from MAF co-financing.

E.2. Paradigm Shift Potential
Degree to which the proposed activity can catalyze impact beyond a one-off project/programme investment

153. The project has replication potential within the target districts which will be possible by at least 6 times. Total population of the six target districts of Baucau, Ermera, Aileu, Viqueque, Lautem and Liquica is 522,000 people, or 43.5% of the total population. These districts together cover 64% of the total land area. This project also has replication potential in the remaining 7 municipalities, which would benefit the reminder of the population.

154. The paradigm shift lies in the proposed strategy to address increasing cost of maintaining functional longevity of small-scale rural infrastructure under the mounting threats from climate change. Baseline pathways will lead to progressively increasing costs of infrastructure, necessitating changes in construction requirements, addition of protection features, and increases in operations and maintenance costs. The alternative pathway the project is proposing is to both improve and climate-proof the engineering designs for infrastructure assets, and utilize bioengineering methodologies and restoration of the catchment ecosystems within which these physical assets are located. As an alternative pathway, such a combined approach reduces not only the risk of climate-related damages to the physical assets, but also the cost of construction and that of operations and maintenance compared to baseline. Therefore, the cost of adaptation will become manageable in the future. This makes the preferred solution viable for upscaling and replication in other areas, which would lead to a paradigm shift. The proposed alternative will also deliver significant auxiliary social, economic and environmental benefits.

155. The steps necessary to achieve this paradigm shift pathway are as follows: First, the project is introducing new skills and methods for generating climate risk information and enhancing engineering capacities. Through introducing new modelling, mapping and risk assessment survey approaches and technologies, the project will address the underlying lack of climate risk information in the country necessary for informed sectoral planning and decision making (especially for rural infrastructure siting, construction, and maintenance). These new methods will be supported by standards and guidelines that enable systematic use of climate risk information in the design and implementation of infrastructure and the management of climate-induced hazards in the future. The resulting improved financial, technical and human resource capacities necessary to undertake hazard, risk and vulnerability assessments and assess the socio-economic damages and losses that can occur due to climate-induced hazards will enhance the level of risk information and allow use of such information in prioritizing risk reduction activities. In addition to enhancing climate risk information, the project is improving engineering capacities and introducing knowledge of new technologies of climate-proofing infrastructure that are locally appropriate (including innovations such as bioengineering methods). These new knowledge, skills and technology will fundamentally change the practice of infrastructure development and implementation and will be transformative. To ensure the longevity of these new capacities, the project will strengthen the sectoral legislative and enabling environment to promote a risk-informed approach to addressing and incorporating climate change considerations into spatial planning, land use regulations, water resource management, and disaster risk management.

156. Secondly, the project is enhancing the enabling environment for PDIM and PDNS funding sources for rural infrastructure development. PDIM and PDNS processes will be supported by longer term investment planning and improvements in broader policies of climate change adaptation and disaster risk reduction. The project will address
the limited nature and decline in investment in rural infrastructure through the PDIM and PNDS rural planning processes as well as the perceived higher cost of including climate resilience into infrastructure development and investment planning. The latter will be accomplished by introducing evidence-based cost benefit analysis into design methods that accounts for climate change, identifying current and future requirements for maintenance under climate change and outlining the costs of climate proofing and maintenance. This project approach to community engagement through the PDIM and PNDS process, will have key benefits including identification of communities and therefore buy-in, greater community ownership and consequently greater efficiency in project implementation.

157. Thirdly, the project will bring about both improvements and restoration activities in catchment ecosystems to improve ecological function. Unsustainable and environmentally harmful rural livelihoods have significantly degraded land in all catchments in TL. This degradation has increased exposure of residents and infrastructure to climate-induced hazards and will further impede rural livelihoods in the future. Ecological restoration will be accomplished through promotion of climate-smart agroforestry and forestry activities. Not only will these efforts improve ecosystem function and infrastructure stability, but they will also yield significant social and economic benefits to the communities. In addressing catchment management, the project is further building resilience into infrastructure development and reducing the long-term cost of infrastructure maintenance.

158. The following diagram presents the project Theory of Change, demonstrating how the activities can remove current barriers and achieve transformational change in infrastructure development. This will result in increased infrastructure and built environment resilience, as well as enhanced livelihoods and resilience of the most vulnerable people, communities and regions of Timor Leste.

159. In summary, GCF funding will: address the lack of climate risk information in TL; strengthen sectoral policy and legislative frameworks via embedding climate change considerations into all sectors that impact the resilience of infrastructure; and build institutional capacity at the central and local levels to enable long-term use of climate risk
information, methods and tools in planning for and investing in rural infrastructure as well as the development of CCA and DRR activities. Furthermore, GCF funding will address livelihood pressures that lead to land degradation via the introduction of climate smart agro-forestry and reforestation in catchments where infrastructure will be developed. This will provide ecosystem-based protection of infrastructure, reduced maintenance requirements in the long-term, and reduced exposure of communities and their assets to climate induced hazards. The preferred solution provides a clear link between activities that seek to address adaptation needs (as per the new CC and DRM laws) and the development of rural infrastructure (as per the Strategic Development Plan). The preferred solution will bring about transformative change in the way in which Timor Leste plans and develops rural infrastructure in the future and will safeguard infrastructure and livelihoods.

E.2.2. Potential for knowledge and learning
160. The project has particularly strong emphasis on knowledge generation, learning and information sharing/dissemination. First, the project will introduce hazard and risk assessment modelling and mapping tools and generate definitive hazard maps for all major climate-induced hazards for the whole country. These will be used in climate risk management and to train MCIE and MSS staff in the use and maintenance of these new tools and technologies. Furthermore, the project will develop damage and loss accounting methods, tools, and technologies as well as asset inventory and management databases. Project activities will provide a series of trainings to the mandated institutions, to include sessions on data collection and treatment, methods of risk and vulnerability assessment, and economic valuation. Under Output 1, the project will facilitate the dissemination and sharing of common and definitive climate risk information needed by all sectors of central government to embed climate risk considerations into their functions. The Climate Change and Biodiversity Centre (CCCB), established under the previous, GEF-funded SSRI project, has a mandate to provide climate information services across all government institutions to facilitate climate responsive policies and decision-making and to undertake capacity building of government practitioners. The proposed GCF project intends to build the capacity of the CCCB to embed necessary skills training (ToT) for long-term sustainable delivery of the key aspects of the capacity development plan.

161. At the municipal level, targeted trainings will focus on engineering methodologies that can help climate-proof infrastructure, including innovative bioengineering methods for slope stability. This new knowledge and set of skills will create the conditions for new engineering practice for more resilient infrastructure development in the country. Through developing manuals and guidelines on infrastructure climate proofing for each category of infrastructure and training municipal staff in the application of these methods, the project is embedding climate resilient infrastructure implementation and long-term management approaches. Following this effort, relevant institutions at national and sub-national level will be strengthened to embed such knowledge and skills for continuity of the learning process. To this end the project will implement the capacity development priorities identified by SSRI and fully consider lessons and findings of SSRI to institute the required capacities, provide tools, methods, engineering skills and other enabling conditions (including the production of climate risk information) to establish an iterative practice of climate proofing for small-scale infrastructure within the PDIM and PNDS frameworks. The project has also embedded training and TOT methods for all project activities to instil knowledge through sustained mechanisms of training, guidance and knowledge generation. The social resilience of communities will be strengthened through a robust knowledge management approach at the community level, utilizing existing CCAPRID - Capacity Development on Climate Change Adaptation Planning for Rural Infrastructure Development and CAMP - Community Action Management Plan processes. In addition, socio-economic data to be collected (Activity 1.1) and updated using local labour/knowledge will engage the community at a whole-of-catchment scale. Implementation of the Stakeholder Engagement Plan will include community engagement and capacity development on topics to include climate risk management and resilience building measures. Meanwhile, formation of community catchment management groups will improve ownership of these interventions while implementation of the Gender Action Plan will ensure that interventions take account of gender specific requirements and enhance gender equality in Timor Leste. In addition, the strengthening of cooperatives through the development and implementation of the agro-forestry strategy will embed knowledge and learning of resilient and sustainable agro-forestry methods and practices within communities.

162. The project will implement a knowledge management (KM) framework (See Chapter 12 of the FS for detailed description of the KM framework). It will have the following key aims:

- To ensure access to data and information generated by the project as well as long-term access to data on which stakeholders’ essential institutional functions rely and/or data and information that can be used for evidence for policy and practice advice (connecting people to information and knowledge)
- Connect key stakeholder groups, practitioners and experts to ensure that key learning and experience is shared within and across sectors (connecting people to people)
- Ensure staff in the stakeholder institutions know about effective and relevant KM techniques so that knowledge is shared, captured and retained by the institutions and shared within and across the sector (institutional KM improvement)
- By developing and promoting KM as a tool for continuous and sustainable improvement and ensuring that KM tools generated by the project will be systematically used and maintained within the stakeholder institutions (Developing and embedding KM tools and practices).
E.2.3. Contribution to the creation of an enabling environment

163. The project is creating three main categories of enabling conditions for climate resilient communities and their physical assets. First, innovative tools and methods will be introduced for hazard, risk and vulnerability assessment, modelling and mapping. Based on this, definitive hazard maps will be provided for key hazards for Timor Leste. Cost-benefit analysis methods and tools will be introduced to embed climate-risk informed, appraisal-led methods of strategic planning for Disaster Risk Management and climate change adaptation. A comprehensive approach to damages and losses accounting will be developed and tools such as a damage and loss digital template (for use on field officers’ mobile phones) will be introduced to collect and transmit damage and loss data in real time. A single comprehensive loss and damage database will be developed and linked to municipality staff and field officer data collection systems. This will provide timely and transparent data collection, transmission, storage, and use of data and will address a current lack of data on climate impacts and disaster losses. Enhanced efforts to collect loss data, coupled with the development of transparent methodologies and the provision of standardized datasets, are urgently needed. Asset Management systems linked to the damage and loss database and utilizing climate risk data will enable systematic condition monitoring and portfolio-risk-assessment based asset management of infrastructure. Data sharing systems across key sectoral institutions concerned with infrastructure development will enable a seamless data sharing for risk assessments and risk validation that is critical for risk informed budgeting and resource allocation. Furthermore, technologies will be utilized to create efficiency in this process. For example, use of drone technology for risk assessment and a long-term observation of change at broader geographical scales (of coastal and inland mountain watersheds) is effective in an island setting. Use of GPS enables local field officers and even community members to participate in local risk assessments by recording coordinates of vulnerable infrastructure as well as change in river flow directions. The GPS data and drone imagery will feed the GIS-based risk and vulnerability maps that will underpin land use decisions, risk reduction and infrastructure development investments. This will also determine target sub-watersheds for rehabilitation and agro-forestry schemes. Second, the project will strengthen institutions in their functions of adaptation planning and implementation. Decentralized investment mechanisms such as PDIM (district / municipal) and PNDS (suco / village) will be supported throughout their planning cycles. By embedding climate risk criteria into PDIM and PNDS planning manuals and guiding documents, the project will create planning and budgeting conditions that support climate risk management in the target vulnerable districts. This will benefit resident vulnerable populations and their essential economic assets (including water supply, irrigation and transport infrastructure). Third, the project will create the conditions to unlock both public and private sector finance for scalable investments into local development and climate risk reduction. Municipal investment plans based on cost-benefit analysis and appraisal-led identification of climate-resilient infrastructure investment requirements will identify both public and private finance mechanisms. Such investment planning will enable evidence-based advocacy for public sector investment into climate-resilient infrastructure. In addition, the project enables community agro-forestry. This creates benefits for catchment management and provides an enabling environment for entrepreneurialism, thus lifting livelihood pressures off the land and addressing current financial access restrictions in rural communities.
E.2.4. Contribution to regulatory framework and policies

164. The project will create enabling conditions by addressing the current gaps in the disaster and climate change policies and respective subsidiary legislation concerning their enforcement. It will specifically focus on the regulations and procedures of municipal / district and village level investment plans to require and enforce climate risk reduction strategies. The project will develop the construction and building codes (in relation to water supply, flood defense and transport infrastructure) that include both construction standards and O&M protocols to enable climate proofing. Environmental and Social Impact assessment law and regulations will be adjusted to integrate climate risk management requirements as well as ensure that climate proofing measures on infrastructure are environmentally sustainable and socially acceptable. Strongly considering the customary law and traditions that influence land use decisions, the project will integrate adaptation policy measures into the land and forest laws. These measures will be devised to facilitate such climate risk management interventions as watershed rehabilitation and enabling community-led and managed agro-forestry schemes.

165. Existing institutions, policies and regulatory frameworks significantly influence the lives of the rural poor. Supporting the capabilities of existing national, and especially local public institutions in servicing the rural communities and reorienting the existing policies of institutions in favour of the poor is an increasingly expected result of development projects and is an expected outcome of this project. This encompasses the change brought about in sectoral and national policies affecting the rural communities and their exposure. In addition, the degree of decentralization, which allows decision making to be taken at the local level, is also a relevant consideration and important to this project.

166. The issues of uptake of climate risk information as the basis for policy and decision making will lead to barrier removal to drive uptake and investments in climate-resilient community infrastructure planning and implementation.

167. The project is attempting to strengthen the PDIM and PNDS processes. As such, the project has the potential to have a long-term impact by effectively embedding climate risk considerations and resilience into the planning design and construction of small scale rural infrastructure. The project will raise awareness to climate risks and build institutional and community capacity to address these risks, implement climate resilient infrastructure, and strengthen livelihoods (Activities 2.2 and 2.3). A key area of focus is the embedding of climate risk considerations into sector policy, and the project will leverage the evidence it gathered from the SSRI project to inform the wider policy framework.

168. The GCF contribution to policy level work includes long-term catchment management strategies for risk reduction and improvements in overarching CRM and DRM policy frameworks. It also includes the introduction of knowledge tools, guiding documents, investment planning, and CR information into sectoral strategies.

E.3. Sustainable Development Potential

Wider benefits and priorities

E.3.1. Environmental, social and economic co-benefits, including gender-sensitive development impact

169. Main economic benefits from the project investment are derived from avoided economic losses due to climate change-induced disasters. Under climate change, economic losses by mid-century from single extreme hazard events are estimated to be $203 Million, $37 Million, $10 Million and $12.5 Million USD for landslides, floods, erosion and drought respectively. These economic losses combined will result in a GDP loss of nearly 11.5%41. The ability to develop and deploy infrastructure services that are resilient to these climate changes will deliver significant economic benefits by not only avoiding economic losses (i.e. reduced rehabilitation and asset replacement costs), but also by creating new livelihood opportunities for the communities that will benefit from functioning water supply and irrigation networks, stable roads and bridges, and flood protection infrastructure (e.g. gabions combined with bioengineering methods). At least 30 engineers will benefit from newly acquired skills and job opportunities to design and deploy climate resilient infrastructure.  

41 Based on current GDP of $2.3 Billion.
infrastructure. These new skills will be in high demand both within the country and in the broader region. Local construction companies and community members will directly benefit from new construction work opportunities offered by the GCF investment, accompanied by the opportunity to further develop skills and participate in a growing labour market of climate-proofing technologies. At least 1,500 workers will be employed over the course of the implementation of the project. In addition, new livelihood opportunities will be delivered by creating enabling conditions to develop community-managed agroforestry. Agroforestry systems offer a diverse set of products and can offer short-/medium-term economic returns to growers while waiting for trees to mature. Such smallholder systems will include intercropping with agriculture crops in the early stages of establishment, offering immediate returns. Some of Timor Leste’s indigenous tree species are of international significance (Santalum album, Eucalyptus urophylla and Casuarina junghuhniana). Some of them have good properties of nitrogen fixation and soil fertilization, provide for fuel wood and construction material, and shade other important commercial varieties like coffee. Furthermore, small-grower agroforestry businesses can support and benefit from small and large industries, such as furniture, rural building construction, veneer, etc.

170. Social benefits of the project relate to increased safety and protection of the local population from climate-related disasters. Thousands of people in Timor Leste remain isolated during disasters such as floods, flash floods or landslides. Unstable infrastructure (or, in many cases, a sheer absence of it) keeps inhabitants of remote municipalities and villages cut off from basic transport services and unable to access local markets, health centres, or schools. Women are particularly affected as they need to reach hospitals during their pregnancy or attend to the health needs of their children. A damaged water supply network also forces women to walk long hours to reach the nearest water sources to collect water for the home. During the wet season, many isolated villages fear that floods will destroy their assets and keep them away from any available support. GCF investment will therefore safeguard local communities and their assets from climate disasters. At the community level, the project will build capacity to identify climate risks and include climate-resilient projects as part of future PDIM and PNDS processes. This will empower communities and help them adapt to climate change. The proposed GCF project is striving to engage and empower women in building resilient infrastructure that meets their needs and addresses some of their vulnerabilities. It is doing so in the following ways: Deliberate targeting of women in the PDIM and PNDS project prioritisation and design process as applied and develop in SSRI project and during feasibility study. It considers roles of women in customary social roles and family responsibilities and the ways that they are specifically impacted by CC. The community engagement process during prioritisation of the 130 infrastructure units, secured their input on current water supply issues which requires them to walk long distances daily to fetch water, and the optimum location of communal standpipes which will serve their villages and reduce this burden. In addition, women have been consulted on their farming practices and their input in the design of the relevant irrigation schemes has been secured. In addition, risks to their agricultural productivity and therefore their ability to feed their families was fully taken into account in developing the agro-forestry requirements which will address current crop yield issues due to soil erosion. The types of crops to be planted under the agro-forestry takes account of the family ‘bread-basket’ requirement of the households and the saleability of surplus produce, in each municipality. Furthermore, in undertaking the socio-economic cost benefit analyst of the project, we have included gender-specific benefits of each infrastructure unit in our calculations. Furthermore, these gender-responsive methods of socio-economic assessment will be embedding in the long-term PDIM and PNDS process for the identification and prioritisation of projects in the future and will be embedded in the guidelines and methodologies. In summary, the project is embedding the gender-responsive community consultation approaches that were developed under the SSRI project into the PDIM and PNDS process guidelines and methodologies. The project is contributing to gender empowerment by reducing the time it takes for chores to be done by women (e.g., fetching water) and providing access to better hygiene and health through the supply of drinking water. Water supply projects have added benefits for subsistence farming as water supply systems are not only being used for drinking water, but for ‘kitchen’ subsistence gardens as well. In addition, road stabilisation projects provide access to markets (both directions) and link communities, thus allowing for greater trade and cooperation. With regard to food security, irrigation projects have the potential to provide increased annual productivity and yield to communities that have more secure water availability for their rice production. Through the community engagement processes, the project will embed gender-differentiated aspects of climate risks into community-based risk mapping. In addition, disaggregating data collection procedures will inform infrastructure prioritisation, design and implementation.

171. Environmental benefits mainly relate to disaster risk reduction investments both in climate-proofed infrastructure and watershed rehabilitation. 300 ha of rehabilitated forest cover and a further 1200ha from MAF co-financing, will provide
water retention and runoff formation; regulation of hydrological flows (buffer runoff, soil infiltration, groundwater recharge, maintenance of base flows); natural hazard mitigation (e.g. flood prevention, peak flow reduction, landslide stabilization) and improve groundwater quality, benefiting 208,367 residents in the target districts. The water supply projects will provide environmental, social and health benefits by contributing to improved sanitation and hygiene through the provision of water supply and through close collaboration with WASH projects. The GCF project will directly contribute to and complement WASH efforts on the ground.

172. Environmental benefits that would accrue from catchment management include resource conservation, crop production and alternate land-use systems. Catchment management interventions of the project will integrate and address both water and the related land resources that affect or are affected by hydrometeorological hazards. Benefits will include management of floods and droughts, surface water and groundwater, water supply and water quality. Related land resources include streams, wetlands, forests, soil, fisheries, flora and fauna.

173. Agroforestry systems play an important role in conservation of natural resources, especially soil. Adoption of agroforestry practices enhances the productivity of resource poor small and marginal farmers. Agroforestry has both productive and service functions. Among the productive functions, fuel wood, fodder and fruit are the most important besides construction wood, gums, resins, medicines, fibres and a host of other economic base and greater food security. The service functions include shade, reduction in wind speed, control of erosion and maintenance and improvement of soil fertility. Agroforestry systems increase nutrients inputs through nitrogen fixing trees and nutrient uptake from deep soil horizons. They reduce nutrient leaching losses through tree root and mycorrhizal systems. Agroforestry systems recycle nutrients through decomposition of litter, pruning and root residues. While agroforests are typically less diverse than native forest, they do contain a significant number of plant and animal species. This diversity can, in time, provide ecological resilience and contribute to the maintenance of beneficial ecological functions. Similar to plantation forests, agroforests can help relieve some of the pressure to harvest native forests.

E.4. Needs of the Recipient
Vulnerability and financing needs of the beneficiary country and population

E.4.1. Vulnerability of country and beneficiary groups (Adaptation only)

174. Timor Leste faces high- to medium- levels of risk associated with multiple natural hazards. Every year it suffers from localized (and relatively small-scale) yet extensive disaster events, mostly related to climate variability. This is compounded by the country’s vulnerability to climate change, arising from the cyclical effects of the Pacific region’s El Nino Southern Oscillation (ENSO) and rainfall variability. As a result of climate change, rural populations, in particular women and children, face increased risks and vulnerabilities.

Climate Change in Timor Leste

175. Climate change is causing Timor Leste to become hotter and drier, with increasingly variable rainfall. Projections cited in the reports of Intergovernmental Panel on Climate Change (IPCC), including those of the Commonwealth Scientific and Industrial Research Organisation (CSIRO) project notable changes in the region’s future climate. The following conclusions are based on historical climate data and the results of climate scenarios generated with both the

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42 Economic appraisal of the benefits of agro-forestry has used REDD+ assessment methods to measure both regulatory and provisioning benefits and the latter came out as marginal compared to the former, therefore this is not presented as a cross-cutting project.
44 Vulnerability to Climate Variability and Change in East Timor, Royal Swedish Academy of Sciences, Ambio, vol. 36, no. 5, (J. Barrett, S. Dessai, RN Jones, 2005)
Regional Climate Model (RCM) using the A1B emission scenario and also 20 Global Circulation Models (GCMs) using new emission scenarios, Representative Concentration Pathways (RCPs)\(^{47}\):

176. In Timor Leste, temperature has been increasing consistently by about 0.016 degrees Celsius per year (INC, 2014). Prior to the 2040s, the mean temperature anomalies in Timor Leste are expected to increase by up to as much as 1°C for all emission scenarios. For the high emission scenario (RCP8.5) the increase in temperature relative to current conditions may reach 3°C by 2100, while for the low emission scenario (RCP2.6) it may increase by up to 0.5°C. It is expected to increase by 0.8–3.6 °C by 2070. Rainfall is predicted to decrease in the dry season and increase in the wet season with overall rainfall increasing by 7–13% by 2050. Extreme rainfall events such as tropical cyclones are expected to decrease in frequency but increase in intensity\(^{48}\). Furthermore, an increase in rainfall is predicted for areas of high altitude. For example, the mountainous districts are projected to experience higher increase in rainfall during the wet season\(^ {49}\).

177. Historical data suggests that during the 20th century and early 21st century, there were already some shifts in the peak of the wet season. In the future, the wet season onset may be delayed by about 20 days from the current climate pattern, while dry season onset will be delayed by as much as 11 days, depending on the period and emission scenarios. Thus, in some areas the length of the wet season would shorten. Extreme rainfall events are projected to become fewer but more intense as a result of decreasing numbers of tropical cyclones albeit with stronger intensity (Pacific Climate Change Science Program 2011). Decreases in rainfall are projected in some parts of the country, as well as changes in its seasonal distribution, with respect to the 1981-2010 conditions. For example, the drier area on the northern coast of the country (annual rainfall less than 1000 mm) will expand in the future. These changes in both spatial and temporal rainfall distribution will have significant impact on the water balance, which suggests that the area with a duration of water deficit period (LDP) of more than 8 months will expand while the area with LDP<5 months will shrink. Historically, the sea level surrounding the main island of the country has risen at about 5.5 mm/year. Following this pattern, over 100 years, sea level rise may reach 76 cm. Based on varying predictions, sea level is expected to rise by between 9 and 88 cm by the year 2100. In addition, based on the Pacific Climate Change Science Program (2011); Pacific Ocean acidification has also been increasing in Timor Leste’s waters. It will continue to increase and threaten coral ecosystems.

Underlying vulnerabilities

178. The degree of geographic isolation/access to urban areas coupled with socio-economic conditions demonstrates that most rural settlements in the country are highly vulnerable and susceptible to climate change induced risks. An ADB study on least developed sucos (villages) measured the living standards across the country against the asset index\(^ {50}\). The sucos with highest living standards are concentrated around the capital Dili and close to district centres. Sucos with the lowest living standards are the most remote and have small population. Access to infrastructure is higher in sucos with higher living standards, and there is a large gap in access between groups. For example, of the 89 sucos with the lowest living standards, the average share of households with electricity is only 3%. This compares with an average share of 66% in the 89 sucos with the highest living standards. Access to improved water and improved sanitation is also much higher in sucos with high living standards.

179. In addition to asset, social and infrastructure indexes, capacity to cope is also an important index of vulnerability. When coping capacity is considered, the analysis showed that the impact of climate change is dependent on the size of the

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\(^{47}\) Climate change assessments from the INC and other studies provides the evidence basis for the climate change discussion


\(^{50}\) Asian Development Bank (2013) Least Developed Sucos, Timor-Leste. The assets used are (i) the share of houses in a suco with good quality floors, roof, or walls; (ii) the share of households owning a hand tractor, television, motorcycle, radio, telephone or mobile phone, refrigerator or freezer, bicycle, car or van, rice husker, rice mill, or boat; and (iii) the average number per person of chickens, pigs, sheep, goats, horses, cattle or cows, and buffalos. Based on these assets, the asset index has been calculated.
change (the increase in % of the municipality which will be affected by the highest category of the particular hazard) as well as the coping capacity for that municipality. This points to the need to enhance the coping capacity of communities and provides a means of identifying where the enhancement of components of coping capacity, namely infrastructure assets, livelihoods and socio-economic conditions, need to be prioritised to address the most vulnerable to climate change. The analysis shows that the climate risks to infrastructure and livelihoods is increasing, and that those who are most affected by such risks will be those least able to cope. This therefore demonstrates the need to address increasing risks to infrastructure, while also addressing threats to the communities.

180. Women play an important role in Timor Leste’s rural communities. In particular, they are active in agriculture as cultivators, laborers and family workers. However, women face significant barriers and inequalities in terms of access to and control over resources such as land, capital and credit as well as access to agricultural inputs and technology, training, information and marketing services. This hinders their full participation in social and economic life in rural communities. Women and girls in Timor Leste are particularly vulnerable to food insecurity. Consequently, they suffer from malnutrition which leads to high rate of maternal, infant and child mortality (Seeds of Life III, 2010). Women’s ability to attain food security through higher agricultural productivity is disproportionally affected by their low social empowerment, weak community influence and lack of control over and access to income, resource and information (Seeds of Life III, 2010). It is further hindered by their isolation due to a lack of mobility and basic infrastructure. Eliminating gender gaps in rural communities is thus paramount to achieving productive rural communities in Timor Leste.

181. When the impact of climate change with coping capacity considerations is assessed for each receptor type (roads, agriculture, water sources, houses) and taking all hazards into consideration, the following municipalities emerge as the most climate vulnerable: Baucau, Ermera, Aileu, Viqueque and Lautem. Liquica is also identified as particularly susceptible to flooding. Based on the assessment of damages and losses under baseline and climate change conditions, the 6 target municipalities will incur the following percentage of the total national losses from a single hazard event under climate change: 63% of property and 63% of crop income losses, 27% of property and 45% of crop income flood losses, 54% of crop income erosion losses and 54% of crop income drought losses. The people and infrastructure in target municipalities are therefore disproportionally affected by these climate-induced hazards.

E.4.2. Financial, economic, social and institutional needs

182. Timor Leste is a post-conflict low income economy with the poverty rate measured at 49%. Over 70% of the population, and over 80% of the female workforce, is engaged in subsistence agriculture, where low crop yields persist. According to the World Food Programme, 20% of the population is food insecure and an additional 24% are vulnerable to food insecurity. This is largely due to high poverty rates, severe deficiencies in infrastructure and public services, but also due to increased climate variability and extreme events. Public education and training services are currently not up to a standard to build a productive, qualified, and skilled population. This translates into weak institutions that are largely understaffed, and not staffed by skilled personnel.

183. Since gaining independence in 1999, Timor Leste has faced great challenges in rebuilding its infrastructure, strengthening civil administration, and generating jobs for young people entering the workforce. The development of offshore oil and gas resources has greatly supplemented government revenues. This technology-intensive industry, however, has done little to create jobs in part because there are no production facilities in Timor Leste, though there are plans to develop domestic processing capacity.

184. The government has focused significant resources on basic infrastructure, including electricity and roads. Limited experience in procurement and infrastructure building has hampered these projects. The underlying economic policy challenge the country faces remains how best to use oil-and-gas wealth to lift the non-oil economy onto a higher growth path and to reduce poverty.

51 It should be noted that Dili on its own will incur 54% of flood losses due to the density of its population so 27% across the 6 target municipalities is still significant and essentially more than 50% of the risk outside Dili.
185. Gross domestic product is $2.3 Billion USD (based on 2011 purchasing power parity), with 1.65% of GDP coming from Foreign Direct Investment, while 9.4% are remittances. Gross national income per capita is $5,362.50 USD (2011 purchasing power parity) with development assistance at 6% of GNI. Of note, and related to the poverty indicators, is the domestic credit provided by financial sector, totalling -53.6% of GDP. The negative value for Timor Leste indicates a weak and unstable domestic financial framework and this is reflected in a very limited access to finance.

186. In Timor Leste 64.3% of the population (694,000 people) are multi-dimensionally poor while an additional 21.4% live near multidimensional poverty (231,000 people). The breadth of deprivation (intensity) in Timor-Leste, which is the average of deprivation scores experienced by people in multidimensional poverty, is 50.1%. The multidimensional poverty headcount is 29.4% points higher than income poverty. This implies that individuals living above the income poverty line may still suffer deprivations in education, health and other living conditions.

187. In addition to existing socio-economic challenges, Timor Leste faces many institutional barriers that need to be resolved. These include: inadequate rural infrastructure investment, existing infrastructure that is prone to failure and not climate resilient, the limited and non-risk informed prioritization of rural infrastructure budget allocations coupled with a lack of access to alternative climate risk financing mechanisms such as private sector finance, and a lack of climate risk information to inform sectoral planning and decision making. In addition, land degradation exacerbating exposure of rural infrastructure to hazards and a lack of coping strategies and capacity at community level to adapt to CC will result in an increased susceptibility to disasters and a deepening of poverty of the rural poor.

E.5. Country Ownership

Beneficiary country (ies) ownership of, and capacity to implement, a funded project or programme

E.5.1. Existence of a national climate strategy and coherence with existing plans and policies, including NAMAs, NAPAs and NAPs

188. The project is fully in line with the adaptation priorities expressed in National Adaptation Programme of Action (NAPA). The NAPA strongly prioritizes climate disaster risk reduction to protect local populations and physical infrastructure. Protection of forest and watershed forest rehabilitation linked with issues of food security are also underscored as important.

189. The project is aligned with SDGs 5, 6, 10, 11, 13, 15. Specifically with regard the SDG 1 the project will

- Strengthen the resilience and adaptive capacity to climate-related hazards and natural disasters in all countries;
- Integrate climate change measures into national policies, strategies and planning
- Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning;
- Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities.

190. The government’s Strategic Development Plan for 2011-2030 offers a vision, targets and indicators for the next two decades. It is built around four pillars: (i) Social capital: health, education and social protection; (ii) Infrastructure: transport, telecommunication, power, and water supply and sanitation; (iii) Economic foundations: targeting three sectors for development – agriculture, tourism and petrochemicals – to bring about growth, jobs, and new sources of public revenues beyond oil; and (iv) Institutional framework: focusing on macroeconomic management and improving the capacity and effectiveness of government institutions. The proposed project as described in the preceding sections is structured around these priorities and offers a direct contribution towards the strategic directions of SDP. The proposed project also contributes to SDG 1 most directly through its contribution towards the access to public services.

191. The Draft National Climate Change Policy intends to provide policy guidance to mainstream climate change into the development policies and prioritizing climate resilience in the development plans. The Policy includes specific sections
on climate resilient infrastructure, Loss and Damage and Disaster Risk Management and Decentralization, and the need to integrate climate resilience into different levels of governance as illustrated below:

**Climate Resilient Infrastructure**

192. The policy aims to:

- Promote climate resilience and climate proofing approaches and concepts in small, medium and large scale infrastructure.
- Identify and map all appropriate and effective climate proofing measures that have been practiced in the country and in the region.
- Commission a comprehensive cost-benefit analysis to assess the benefits and losses incurred by climate change and climate-induced disasters, while integrating climate resilient options into infrastructure development designs.
- Integrate climate resilience aspects into the Environmental Impact Assessment (EIA) regulations and introduce provisions to make EIAs mandatory for all infrastructure development activities.
- Develop a climate risk zone map disaggregated by key climate risks to guide infrastructure development projects.
- Identify the most climate vulnerable communities as well as the underlying factors contributing to their vulnerability. Recommend appropriate infrastructure development priorities in those areas, such as improved access to water, irrigation canals, roads, or health facilities, etc., to help enhance community resilience.
- Develop the capacity of the technical teams responsible for designing, approving, commissioning and implementing infrastructure development projects in the government as well as private sector to integrate climate resilience and environmentally friendly options into their work.
- Integrate climate resilience into the existing monitoring and evaluation templates used by government authorities such as Ministry of Public works, Transport and Communication.

**Loss and Damage**

- Collaborate with existing vulnerability assessments, natural disaster risk assessments and complement the information on existing and potential loss and damage incurred by the climate change, disaggregated by type of loss and damage, sector, and region.
- Prepare a repository of data and information on the existing and potential loss and damage, disaggregated by sector, magnitude, gender, and geography.
- Establish a Task Force led by the Multi-Stakeholder Committee for Climate Change specifically for Loss and Damage.

**Disaster Risk Management**

- Make provisions of updating climate risks and vulnerability zones in collaboration with the NDMD to prepare risk sensitive land use planning.
- Implement Risk Sensitive Land Use Plan to ensure that human settlements and infrastructure are not built in climate risk zones or disaster prone areas.
- Collaborate with the Ministry of Social Solidarity to develop local level disaster risk reduction action plans that can be used to prioritize and implement disaster risk management interventions at the community level.
- Integrate disaster risk management aspects into local development plans and budget allocation guidelines.
- Coordinate with national and subnational disaster operating units and centres to help make informed decisions.
- Integrate early warning mechanisms and early recovery mechanisms into livelihood enhancement programmes such that there is an integrated approach to managing disaster risks at the community level.
- Create a platform for better coordination and collaboration between climate change adaptation and disaster risk management interventions.
- Make provisions of community shelters to evacuate people at risk during the event of climate induced disasters.
- Promote integrated watershed management aspects, sustainable infrastructure development and community-based approaches to disaster risk management.
193. The Draft Disaster Risk Management (DRM) Policy underscores the need for robust, systematic and reliable climate data to make informed decisions on DRM and the linkages between the climate change adaptation measures and DRM measures. The alignment and complementarity with climate change actions and priorities are made visible through the objectives and priorities in the DRM Policy, such as:

- The DRM Policy will “create an integrated national capacity to identify, assess and monitor disaster risks (including hazards, vulnerabilities, exposure levels and economic effects together with prevailing capacities), including the effects of climate change”.
- The DRM Policy will “promote development planning and programming into which disaster risk management is integrated along with climate change adaptation.”

194. To ensure that the disaster risk management aspects are well integrated into different levels of planning, budgeting and execution of local and national development, the DRM policy proposes key areas of intervention including:

- Risk assessment and identification;
- Preparedness and Response Planning;
- DRM communication.

Proposed areas of intervention under Risk Assessment and Identification are:

- improved risk assessment and mapping,
- access to assessment data to all stakeholders in disaster risk management,
- comprehensive disaster damage and loss data management to provide tools for analysis, planning and programming alongside risk assessment.

195. The Revised Draft National Forest Policy emphasizes the integration of conservation, protection, and management of forest resources. Though the linkages have been drawn with allied sectors such as watershed management, agriculture, biodiversity, land use management, and cross cutting aspects (such as capacity development and climate change), these linkages are not very strong. The policy instruments that have been identified to facilitate implementation of the Policy are:

- community-based management of forests and watersheds
- participatory reforestation and land restoration
- forest conservation and protection
- market and enterprise development
- extension, training, research and information
- incentives, valuation and monitoring

196. Direct reference to climate change is made under the Policy Instrument of the Forest Conservation and Protection and climate change adaptation under the community-based management of forests and watershed, forest resource based market and enterprise development and the participatory reforestation and land restoration topic areas. The linkages drawn speak to the need for control of land degradation, sustainable land use management, combating desertification, reforestation and climate vulnerability assessment with focus on forest resources and forest management also have strong climate change adaptation and mitigation connections.

197. MAF’s Strategic Development Plan 2014-2020 (MAF SDP) was developed based on the priorities for the agriculture, fisheries and forestry sectors outlined in the Timor Leste National Strategic Development Plan 2011-2030. MAF SDP’s main objectives are to: (i) focus on agricultural and rural development that supports small farmers and promotes improved markets in order to reduce poverty; (ii) ensure food and nutrition security, and sovereignty; and (iii) promote economic growth and employment in rural areas, and thus across the nation.

198. MAF commenced in 2015 a review of the National Forest Law with support from the Food and Agriculture Organisation (FAO) and is currently developing a long-term forestry investment plan to diversify from the largely oil-dependent economy, which is a strong signal of the renewed priority being placed in the development of the forestry sector.

199. Furthermore, in June 2016 the GoTL sent to the National Parliament the draft new Land Law which will, inter alia, provide the required legal framework for agroforestry, giving more security and ownership to local assets (i.e. land and trees). Customary rights are mentioned in the new proposed Land Law but there is a lack of provision on how communities’ rights will be protected and how to create an enabling environment that would sustain agroforestry development.
200. There is strong commitment from the government of Timor Leste to implement this project. The project is based on an approach that seeks to build national executing capacity, to ensure maximum ownership and sustainability. Wherever possible, activities will be led by government department and external assistance or service providers will be contracted on an as needed basis.

E.5.2. Capacity of accredited entities and executing entities to deliver

201. UNDP is one of the largest brokers of climate change grant support to developing countries focusing on the main signature programmes: (i) supporting integrated climate change strategies; (ii) advancing cross-sectoral climate resilient livelihoods; (iii) ecosystem-based adaptation; (iv) fostering resilience for food security; (v) climate resilient integrated water resources and coastal management; and (vi) promoting climate resilient infrastructure and energy. UNDP globally has an excellent track record and experience in implementing climate adaptation and disaster risk reduction programmes and projects as well as highly competent technical team at HQs and regional offices.

202. UNDP provides a vital coordination role for catalyzing enhanced capacity to adapt to climate change risks and impacts across sectors in Timor Leste. The UNDP Country Office plays an important convening role for an entire UN system serving to consolidate all efforts across multiple UN agencies under the unifying framework of “delivering as one”.

203. UNDP in Timor Leste has a long-standing relationship with the key ministries and departments and in close partnership delivers the largest climate change and disaster risk reduction portfolio in the country (amounting to USD $18 million in 2017). Therefore, UNDP Country Office in Timor Leste has a track record of implementing large scale projects, with both soft and hard assistance components. UNDP in Timor Leste, through its government partner the Ministry of State Administration, has recently successfully completed the Small Scale Rural Infrastructure, or SSRI, project. This prototype project will serve as a basis for scaling up under this GCF project. The country office in Timor Leste is supported by Regional Technical Advisors at the UNDP offices in Bangkok, Thailand, as well as by policy, adaptation, economics and climate modelling experts in at the HQ and regional offices. The project will be implemented by Ministry of Commerce, Industry and Environment using UNDP’s National Implementation Modality, which is designed to ensure domestic systems are used for accountability. The interventions through this project will be compliant with the Fund’s ESS and compliant with stakeholder consultations. UNDP has a three-tiered quality assurance system. Services that UNDP will provide to the Implementing Partner in support of achieving project outcomes includes undertaking all procurement for the project. UNDP’s services will be provided by staff in the UNDP Country Office (Dili), UNDP Asia Pacific Regional Hub (Bangkok) and UNDP Headquarters (New York). UNDP will act as the Quality Assurance partner for the project.

204. While the overall execution/implementation of project will rest upon the MCIE as an implementing partner, concrete outputs and activities/sub-activities will be implemented by a combination of experts from a number of parties. These will include various government entities as responsible parties (relationships facilitated through Letter of Agreements between UNDP and responsible parties), as well as consultant teams and organizations which will be procured through open competitions and request for proposals. More specifically, the project will engage the following responsible parties in achieving project outputs:

205. Ministry of Commerce Industry and Environment (MCIE): This agency houses the National Directorate for Climate Change and the Centre for Climate Change and Biodiversity and is the lead government agency on climate change policy and legislation. It is comprised of three national directorates – National Directorate for Climate Change (NDCC), National Directorate for Planning Control and Environmental Impact (NDCPEI), and the National Directorate of Pollution and Biodiversity (NDPB). The NDCC is mainly focused on international climate change activities, while NDCPEI (planning application) and NDPB undertake biodiversity impact assessments for infrastructure projects. The NDPEI directorate is responsible for EIA as well as project categorisation and signoff of projects based on successful EIA completion. The role of MCIE includes the development of methodologies for addressing climate risk in all sectors, collaboration on bioengineering methods, and undertaking EIA and environmental safeguarding of infrastructure projects. The GEF, GCF and UNFCC focal points and Designated National Authority for Timor Leste also sit within the MCIE. Main programmes implemented with the applicable UN agency/ies include: Renewable Energy Project; -Second National Communication (SNC) Project; Strengthening the Resilience of Small Scale Rural Infrastructure (SSRI) Project.
and Local Government Systems to Climate Variability and Risk, Timor Leste (SSRI Project); Strengthening Community Resilience to Climate induced disasters in the Dili to Ainaro Road Development Corridor, Timor Leste (DARDC Project); GCF Readiness; Cross Cutting Capacity Development (PIF formulation). For this GCF project, the MCIE will be the Implementing Partner (specifically through the Climate Change Directorate) responsible for coordinating project activities. MCIE will also be responsible for coordination of cross-sectoral climate risk working group.

206. Ministry of State Administration (MSA): This agency is responsible for infrastructure at all levels and, through the National Directorate for Local Administration, is responsible for local development and good governance through decentralisation of functions. PDIM and PNDS processes are the main mechanisms by which this decentralisation of infrastructure development is achieved. Community-driven programmes using the PDIM process are therefore of importance to the MSA and fully aligned with the strategy of decentralisation for local level rural economic development. Likewise the PDIM and PNDS are aligned with the Strategic Development Plan 2011-2030, which includes the opening of rural roads to all hamlets and actively promoting revegetation and reforestation to protect the forests. Under this GCF project, the MSA will be the lead agency and Responsible Party for Activities 2.1 and 2.2, and their activities will include development of standards, manuals, guidelines for climate resilient designs, responsible for leading the municipality engineers on the design and implementation of climate resilient infrastructure. The MSA was the main implementing agency for the SSRI project. Under the GCF project, the MSA will be responsible for: developing long-term municipal investment plans for PDIM and PNDS; liaising with MCIE on climate change policy, legislation and cross-sector CC risk information embedding; supporting standardization of climate resilient designs, evidence-based policy influencing and scaling up; organizing awareness raising and training events; development of step-by-step guidelines for climate risk reduction measures for all categories of small-scale rural infrastructure (water supply, road and bridges, irrigation, flood defences) through the PDIM manual – CAMP; and development of community-based management and maintenance protocols (such as the GMF manual, KAM), municipal procurement guidelines, and administrative post and the Ministerial Technical Committee review checklists. The MSA will provide technical assistance to Administrative Post (AP) staff in prioritizing projects at this level and in undertaking an appropriate number of feasibility studies on which to base climate-risk informed project prioritization. At the municipal level, the MSA will introduce climate risk criteria into the prioritization process. Furthermore, the MSA will undertake detailed CBAs for 130 prioritised infrastructure projects in 6 target municipalities. They will also provide capacity development to enhance the ability to undertake engineering feasibility studies and incorporate climate-risk considerations.

207. The Ministry of Social Solidarity (MSS) - National Disaster Management Directorate (NDMD) and the National Disaster Operation Centre (NDOC): The MSS is responsible for providing disaster risk management coordination and technical support to the government and communities in Timor Leste. The National Disaster Management Directorate (NDMD) and the National Disaster Operation Centre (NDOC) are organisations within the Ministry of Social Solidarity. MSS will be the lead agency and Responsible Party for Activities 1.1 and 1.2. Utilizing technical assistance, the MSS will develop and undertake multi-hazard, risk, and vulnerability assessments and mapping as well as damage and loss accounting activities. As part of this process they will work with communities to identify past impacts from hazards. Their main responsibility will be for DRR, DRM, establishment and maintenance of DRM systems, and the purchase and maintenance of software, hardware, and equipment for the monitoring and management of climate-induced disasters. The MSS will be responsible for development of DRMapp as well as the purchase and maintenance of drone equipment and technology and development of mobile GIS-based asset condition inspection methods and tools. In addition, the MSS will be responsible for development of the asset management system and damage and loss database as well as the development and introduction of guidelines for new systems and methodologies and the coordination and management of municipality disaster data collection.

208. The Ministry of Public Works, National Directorate for Water Resources and BESIK, is responsible for policy, planning, execution, organisation and monitoring of all water systems implemented by government and also all government partners. All agencies and NGOs who work on water supply system activities must work directly with the directorate for Water and Sanitation. The directorate will provide input to Activity 2.1 via development of Climate proofing standards and manuals for rural water supply and flood defence infrastructure, collaboration on climate resilient design approaches and sustainable O&M methods for rural water, sanitation and hygiene sectors, and standardization of designs and climate resilient policy development. The Ministry of Public Works, National Directorate for Water Resources will also be involved in the design and implementation of water supply schemes under the project.
209. The Ministry of Public Works’ Roads 4 Development effort will be involved in the design of roads, road drainage structures and other related small infrastructure works. In addition, they will help with the standardization of designs and climate resilient policy development related to rural roads, and technical capacity development for communities and LA’s.

210. The Ministry of Agriculture and Fisheries (MAF) is the government institution mandated for the development of the main rural sectors and for coordinating rural development. The Directorate of National Forestry plays an important role in watershed management and reforestation in catchment areas in order to respond to climate change. It has established coordinating mechanisms at all levels for harmonizing functions, planning and implementation and for monitoring progress of achievements in rural development. It will be the Responsible Party for Activity 2.3. With Technical Assistance, it will develop agro-forestry and reforestation strategies for target catchments, implement agroforestry and reforestation schemes in these catchments, train local extension workers, train communities to implement and maintain agroforestry activities, and undertake long-term monitoring of agroforestry schemes.

211. Municipalities, Development Commissions, and Local Authorities will be responsible for the implementation of PDIM and PDID projects. In addition, they are responsible for local planning, development of strategic municipal plans, budgeting, and infrastructure development. During the project, these entities will undertake the development of annual climate-resilient investment plans, determine budgets, implement climate resilient small scale infrastructure and ecosystem services, standardize infrastructure designs, scale up best practices across the entire Municipality Plans programme, and engage in evidence-based policy advocacy. Through the PDIM, PNDS and under MSA, they will be responsible for implementation of Activities 2.1 and 2.2. This will include responsibility for detailed design and implementation of climate resilient infrastructure with MSA technical assistance. In addition, this will include engineering inputs to feasibility studies, detailed design, procurement and implementation of 130 infrastructure schemes (TA, municipal input, international experts, community engagement, bill of quantities development, procurement process, construction supervision, construction hand over, etc.).

212. Activities related to community-based engagement and training will be implemented by a group/consortium of international and local NGOs that have grassroots experience in the areas of community-level participatory infrastructure development and disaster risk planning and management, integrated natural resources management, community mobilization and empowerment. These will include implementation of agroforestry and reforestation strategy for infrastructure sub-catchments. Technical guidance to and QA/QC of contractor’s work will be provided by an international consultant(s) hired by UNDP.

213. An Informal multi-stakeholder Technical Advisory Working Groups (TAWG) will also be established to provide inputs to and endorsement of the design and quality of the project outputs. The TAWG members will represent the government, private sector, academia and civil society to provide guidance and technical advice on the project.

E.5.3. Engagement with NDAs, civil society organizations and other relevant stakeholders

214. This proposal has emerged as a result of government’s request and series of consultations for project definition. A dedicated UNDP mission was organized during March 4-11, 2016 upon the request of the NDA/GCF focal point Mr. Mario Ximenes. Communities have been met and consulted in the municipalities of Liquica and Aleu. Discussions covered the issues of disaster risk reduction, mainly the challenges of flood protection, problems of infrastructure stability in the face of climate disasters and potential of community resilience and development. The communities prioritized the transport infrastructure, water supply and flood risk protection.

215. On March 9, 2016, MCIE convened a stakeholder consultation meeting to review the GCF priority result areas and investment criteria. UNDP has been invited to present the GCF, programming priorities, eligibility criteria and main compliance requirements. A diverse group of stakeholders from the Ministries of Agriculture, Forestry and Fisheries, State Administration, Public Works and Construction and Social Solidarity attended the workshop. Despite a wide array of priorities, most participants agreed that addressing the district infrastructure deficit is among the major binding constraints for socio-economic development in Timor Leste. There was a consensus among the stakeholders to focus
on climate resilience of district and village infrastructure that will build on the good practices and lessons of the relevant pilots, including those supported by UNDP. The project will bring the livelihood development into the mainstay of its strategy. Forest vegetation is a paramount factor of land stability. Supporting community agroforestry (coffee, fruit, timber and herb tree production) will lift the livelihood pressures on forests, stabilize broader land areas and hence minimize susceptibility and exposure to climate hazards. Furthermore, the GCF initiative can facilitate multiyear municipal investment planning, which will identify public and private (e.g. commercial banks) finance for climate resilient infrastructure and community livelihood development investments.

216. The GCF project concept was developed in close collaboration with the National Designated Authority (NDA) and informed by stakeholder consultations. Consultations included the following:

- Initial consultations (25th July 2016 to 3rd August 2016)
- Ministry Commerce, Industry and Environment (MCIE)
- Ministry of State Administration (MSA)
- Ministry of Social Solidarity (MSS)
- Ministry of Agriculture and Fisheries (MAF)
- Ministry of Planning and Strategic Investment – Mega Projects (MPIE)
- TL-National Commerce Bank (BNCTL)
- TL-Central Bank (BCTL)
- Ministry of Public Works, Transportation & Communication (MoPTC)
- Prime Minister Office (OPM)
- Chamber of Industry and Commerce – Timor Leste (CCI-TL)
- Bilateral and interdepartmental consultations (2nd November to 11th November 2916); MCIE, MSA, MAFF, MSS, MPIE, MoPTC (mainly Directory Generals), OPM, ILO GIZ, CCI-TL
- Community consultations and field surveys (28th July); District Administrators from the following municipalities (Bauca, Ermera, Aileu, Dili and Maliana)
- National workshop. (7th November 2016)
  - Participating stakeholders - Govt: Directors/Focal Persons from MoF, MSA, MCIE, MoPTC, MPIE, MSS, MAF, OPMO: UNDP, ILO, IFC
  - Summary of workshop – The key activities within the project concept were presented to the audience and the technical feasibility was debated with the technical directors present. Broad agreement was reached on all activities.
- High level ministerial consultation (9th November 2016); Minister of MCIE, Minister of MSS, Minister of MSA, Secretary of State of MSA
  - Summary of workshop – The key activities within the project concept were presented to the audience and the technical feasibility was debated with ministers. The Secretary of State was present. Broad agreement was reached on all activities. Main issues raised were regarding the implementation arrangements for the project. Also, questions regarding the number of municipalities being included in the project and whether it could include all municipalities.
- Final workshop to validate the concept note (30th March 2017). Minister of MCIE, Secretary of State of MSA, Directors/Focal Persons from MSA, MCIE, MoPW, MSS, MAF, UNDP, ILO, IFC
  - Summary of workshop – The further elaborated key activities within the project concept were presented to the audience and their technical feasibility was debated with the technical directors present. Broad agreement was reached on all activities. MCIE was confirmed as Implementing Party and all Responsible Parties confirmed as outlined in the implementation arrangements diagram.

Consultation with municipalities – Infrastructure Project Identification

Stage 1 - National Level Consultation

Workshop

52 Several bi-lateral meetings, email exchanges etc. were conducted throughout the project formulation
217. A workshop was conducted to explain the background and context of the GCF proposal including the criteria for the selection and identification of proposed infrastructure projects with due consideration to the changing climate related hazards that will compromise the projects.

**Desk Review**

218. Desk review of municipal projects as proposed part of the PDIM documents. Projects listed in the PDIM document that falls within the criteria of Small-Scale infrastructure and likewise offers greater benefit to vulnerable families or families and properties at risk due to Climate Change related hazards were initially selected.

**Stage 2 - Municipal Level Consultation**

219. Projects initially selected were validated to confirm that they meet the criteria of falling within areas that are highly at risk as a result of Climate Change and if said infrastructure will reduce vulnerabilities of livelihood systems and other lifelines as well. GIS using hazard map layers and google earth images and local knowledge were used in this activity.

**Stage 3 - Community consultation**

220. Community leaders were contacted and met to validate the social acceptability of proposed projects. The team also conducted visual inspection of the proposed sites together with community members and municipal engineers. Different teams of SSRI engineers and GIS experts covered the Eastern part and Western municipalities.

Consultation with municipalities – Agroforestry;

221. The following topics were explained as part of the introductory remarks before the formal consultation:

- A brief background of the GCF proposal and how the project will contribute to the improvement of the condition of potential project beneficiaries;
- The maps showing the specific location of the proposed projects;
- The reason why the projects were selected and proposed and why there is a need to protect them from climate change related hazards and why are they at risk;
- The basic concept of agroforestry and its potential as a mitigating measure (in addition to bio-engineering);
- The catchment approach as a methodology of defining the target sites for reforestation and agroforestry as a mitigating measure;
- The possible roles of the government during the implementation of the agroforestry intervention

222. The list of participants during the consultation meetings is shown in Annex XIII(d). After the discussion, the consultant also explained how the fruit trees will function as a component of the agroforestry intervention and how it will discourage farmers from cutting them or burning the land. The municipal officials also showed their willingness to promote agroforestry and the planting of the agroforestry trees identified.

**E.6. Efficiency and Effectiveness**

**Economic and, if appropriate, financial soundness of the project/programme**

**E.6.1. Cost-effectiveness and efficiency**

223. In terms of efficiency, the combination of interventions related to natural capital and physical infrastructure has been shown to lead to significantly higher improvements in resilience than if the project included only a single approach. Based on previous experience and lessons, consolidated during the feasibility assessment, the project addresses the fundamental barriers to achieving resilience by the provision of technical capacities, engineering skills, policies, codes, and ordinances. This will enable climate-proofed infrastructure development as well as investment in watershed restoration for climate risk reduction, resulting in long-term resilience of vulnerable communities and their physical assets. Investing in natural capital is more effective in the long-term as it will help decrease the cost of climate-proofing of infrastructure by reducing levels of exposure to climate hazards.
224. This project could have focused on implementation of climate resilient infrastructure for the target municipalities as the only intervention. While this would benefit the target municipalities and might have had a trickle-down effect on other municipalities, it would not result in the fundamental change in how small scale rural infrastructure projects are identified, prioritised and implemented to be more climate resilient. By addressing the missing climate risk information nationally, the project will lay the foundation for all infrastructure developed to be made climate resilient in the future. In addition, by addressing the legislation, policy, standards, guidelines and technical capacity gaps, the project is ensuring that climate proofing of infrastructure becomes a requirement within a suitable legislative and enabling environment in the future. It also ensures that the approach is integrated within the wider CCA and DRM framework. Furthermore, the adoption of this holistic and integrated approach that addresses all the root causes including land use management, will have long-term efficiency and effectiveness benefits.

225. Overall, the proposed solutions were designed to be in line with best practices and community ownership, as well as present synergies across the two outputs and interrelated activities. In addition, they builds on ongoing efforts to ensure their efficiency and cost-effectiveness. The proposed activities and interventions will reach 45% of the total population (counting both direct and indirect beneficiaries) over six municipalities.

E.6.2. Co-financing, leveraging and mobilized long-term investments (mitigation only)
N/A

E.6.3. Financial viability

226. Without GCF funding, the economic losses from a single extreme event of combined hazardous consequences (e.g. involving floods, landslides, and erosion) could be as much as $141 Million in the 6 target municipalities. PDIM and PNDS budgets of $12.5 Million USD over 5 years, on its own, therefore will not mitigate against this potential size of economic losses, particularly with the non-climate-resilient approaches currently used in PDIM and PNDS.

227. The public goods nature of this project’s outputs doesn’t entail significant revenue generation or cost recovery from the project. Where income generation opportunities exist, these apply directly to the beneficiaries (for instance, improved agricultural income) primarily as household income. A financial analysis for the project is detailed in Annexes XII (c) and (d). The project cost-benefit analysis is provided in Annexes XII(a) and XII(b).

228. Financial viability of the project investments is assured through a combination of elements that build ownership and the technical, financial, operational and institutional capacities of the national and sub-national governments and local communities to maintain and derive economic, social, environmental benefits from the proposed investments. The project does not create undue long-term burdens on the governments in terms of long-term O&M costs. Most community-level infrastructure investments are subject to local arrangements for maintenance and operations, except for rural roads, for which co-financing has been identified through the Roads for Development (R4D) regular road maintenance operations of the Ministry of Public Works, Transport and Communications (MPWTC).

E.6.4. Application of best practices

229. The proposed project is based on a set of best practices and lessons learned emerging from past projects and from experience derived by sectoral ministries and development partners in Timor Leste. Key lessons are derived from the UNDP-supported project “Strengthening Small Scale Rural Infrastructure in Timor Leste – SSRI project”, which has piloted techniques, approaches and investments in the small scale rural infrastructure in three Municipalities - Baucau, Ermera and Liquica. Other lessons are derived from the UNDP-supported project – “Dili-Ainaro Road Corridor (DARDC) Project”.

230. Under the SSRI Project critical small scale rural infrastructure was designed to be climate-resilient and implemented through participatory approaches. In addition, the project strengthened local governance systems, at the municipal and Administrative Post levels. SSRI supported integrating climate change issues into Municipality and local level planning and implementation of PDIM projects in a manner that makes them withstand risks and impacts of climate change. The
overall goal of the project is to safeguard development benefits for rural communities from future climate change induced risks, which is in line with, and underpinned by, a number of important policies and strategies governing Timor Leste’s national development and its specific response to climate change.

231. The project successfully completed the climate-resilient design and implementation of small-scale infrastructure projects using the government District Investment Development Plan (PDIM) project implementation process. Many of the projects include bio-engineering catchment management approaches: for example, planting along drainage routes (e.g. Ossoala and Maubaralisa), vegetation for protection of water sources (Ossoala, Lacoliu), catchment management practices such as engaging communities in planting (e.g. Ossoala with NGOs, Talimoro, Ermera - planted 2,000 seedlings), and bio-engineering measures to protect structures (Legiuema 10 bridges, Lisadilla flood defense). The project supported the establishment of the Centre for Climate Change and Biodiversity (CCCB) within the University of Timor Leste (UNTL) and MCIE through the provision of technical assistance (expertise and training), computer equipment, GPS equipment and GPS training, GIS software for climate mapping, mapping exercise, and facilitation of experts in climate mapping.

232. The following approaches have been tested to developing climate resilience infrastructure in the SSRI project, which will also be used for the GCF project:

1) Water Supply systems
   a. Identification of sources at risk from reduced supply due to droughts, and calculating requirements for upgrading sources and extending dependability of supply
   b. Protection of water sources from pollution by revegetating land around sources, formalising informal sources (putting in pipes and collection/storage systems to enhance environmental protection and supply dependability)
   c. Installation of standpipes in villages and connection to existing sources

2) Roads and Bridges
   a. Rehabilitation of bridges that are usually washed away in the rainy season using climate resilient materials, and protection of bridge openings with bioengineering methods (e.g. Vetivier grass) in combination with sustainable structural measures such as gabion baskets
   b. Vegetation of road corridors with bioengineering material such as Vetivier grass, re-sizing of road drainage systems that accommodate flows, taking account of climate change flows.
   c. Engagement of local communities in the vegetation of road embankments, as well as for wider catchment re-forestation to protect road works

3) Flood defences
   a. Building of flood defences to protect communities currently at risk using bioengineering methods to protection flood embankments from erosion.
   b. Design of flood defences to flood levels that take account of climate change

4) Irrigation systems
   a. Construction of new irrigation schemes which include water storage systems to store water for use in the dry season and mitigate against drought.

233. The GCF project will build upon the lessons learned from the SSRI project to further embed climate resilient infrastructure planning and management by:

234. By ensuring the project impact on rural communities includes enhancement of the value and derived benefits from existing community assets such as land, water, livestock and livelihoods, the project will increase the capacity of local communities to exploit potential economic opportunities and to develop stronger links with markets and external partners. This will be supported through the infrastructure improvements provided by the project.

235. Existing institutions, policies, and regulatory frameworks significantly influence the lives of the rural poor. Supporting the capabilities of existing national, and especially local, public institutions in servicing the rural communities and reorienting the existing policies of institutions in favour of the poor is an expected outcome of this project. This will be
achieved through the change that will be brought about in sectoral and national policies affecting the rural communities and their exposure. In addition, the degree of decentralization, which allows decision making to be taken at the local level, is also a relevant consideration and important to this project. Hence, strengthening local level organizations in the implementation of infrastructure projects (Activity 2.1) is a key impact of the project and should result in enhanced local capacity to implement and use new climate resilient measures in the long-term. The GCF will further strengthen the PDIM process to truly embed climate risk considerations and resilience into the planning design and construction of small scale rural infrastructure.

236. The GCF project is also scaling up best practice from the DARDC project. The DARDC project is strengthening the resilience of communities living along road infrastructure in DARDC to climate-induced disasters such as floods and landslides, and reducing the risk of damage to such infrastructure by specifically targeting and strengthening institutional and technical capacities of sub-national government officials to plan for and implement disaster risk management (DRM) measures using ecosystem-based approaches. The ecosystem-based approach to DRM is supporting community livelihoods and restoring ecosystems to reduce the risks posed by climate-induced disasters. Communities in the project area, particularly local women, are implementing agroforestry techniques that are enhancing their livelihoods while protecting the infrastructure being developed. The project is also clarifying the link between climate risk reduction and sustainable agricultural practices by systematically using the land use enhancement along road development corridors and other types of infrastructure to increase climate resilience.

### E.6.5. Key efficiency and effectiveness indicators

<table>
<thead>
<tr>
<th>GCF core indicators</th>
<th>Estimated cost per t CO₂ eq, defined as total investment cost / expected lifetime emission reductions (mitigation only)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>(a) Total project financing</td>
</tr>
<tr>
<td></td>
<td>(b) Requested GCF amount</td>
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<td></td>
<td>(c) Expected lifetime emission reductions overtime</td>
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<td></td>
<td><strong>(d) Estimated cost per tCO₂eq (d = a / c)</strong></td>
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<tr>
<td></td>
<td><strong>(e) Estimated GCF cost per tCO₂eq removed (e = b / c)</strong></td>
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<tr>
<td></td>
<td>N/A</td>
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</tbody>
</table>

Expected volume of finance to be leveraged by the proposed project/programme and as a result of the Fund’s financing, disaggregated by public and private sources (mitigation only)

| N/A |

Other relevant indicators (e.g. estimated cost per co-benefit generated as a result of the project/programme)
### F.1. Economic and Financial Analysis

#### Summary of Economic Analysis

237. The economic analysis of the proposed project was carried out in accordance with the Guidelines for the Economic Analysis of Projects of United Nations Development Program. The economic efficiency of the investment was determined by computing the economic net present value (NPV) with an assumed 10% discount rate, and the economic internal rate of return (IRR). For consistency purposes, all proposals developed with the support of UNDP have opted to use a 10% discount rate, in line with the existing practice of multilateral development banks.

238. Economic values (costs and benefits) are all measured in real terms in 2017 values. Economic costs of the project are net of taxes, duties, and price contingencies. Furthermore, the analysis assumes a shadow wage rate of 1.00 for unskilled and semi-skilled labour in Timor Leste. Provided that the economic cost of labour in Timor Leste is expected to be lower than the market wage rate (given Timor Leste’s current unemployment rate of approximately 60%), we expect this assumption leads to significantly overestimating the economic cost of the project, and underestimating the true net economic value of the project.

239. As is common when undertaking the economic analysis of investment projects, numerous assumptions were used to delineate the “with project scenario” from the “without project scenario”. These assumptions are presented and discussed below. Assumptions were made to underestimate the true net economic value of the proposed investment project.

#### Overall Project Economic analysis

240. As part of the development of the project feasibility, a cost-benefit analysis (CBA) was undertaken for the 130 infrastructure schemes to be implemented. Implementation prioritization was based on this CBA. The CBA analysis has been taken forward to derive the overall project net present value (NPV) and other economic indicators.

241. The total project capital cost amounts to USD $60.04 Million. GCF’s contribution is estimated to be USD $22.953 million while co-financing from the Government of Timor Leste will be USD36.687 Million, which includes Operational and Maintenance costs of USD 7.187 Million during project implementation. Other co-financing from UNDP of $400,000 is provided. The annual breakdown of contributions is presented in the table at the end of the section (See Annex XII(a) and XII(b) for more detail). Capital investment take place over the 6-year period of project implementation. O&M cost are assumed to start in year 2 and are annual and periodic (5-yearly) in nature. All periodic O&M costs between year 6 and year 10 are presented in year 7 which will enhance the present value of costs when compared with the present value of benefits.

242. Following a risk based analysis of the extent of hydro-meteorological hazards (floods, landslides, erosion and drought) in all Municipalities and watersheds in Timor Leste, 6 Municipalities were selected and structural measures were identified in each to create resilience to four components of public infrastructure: Rural Roads, Water Supply, Irrigation Systems, and Flood Protection. In addition, areas of high risk land erosion were identified with a view to introduction of agroforestry options to minimise the effects of erosion on agricultural land. As described above, some 130 projects were evaluated using CBA from 144 projects initially selected by UNDP SSRI (Small Scheme Rural Infrastructure) team in the 6 Municipalities.

243. Capital, operational (where appropriate) and maintenance costs were provided for each project and the Internal Rate of Return calculated based on monetised benefits relating to the avoidance of economic losses to communities (Sucos) assuming no resilience measures were put in place (The Do Nothing option). Clearly these resilience measures can never prevent all losses associated with worsening hydro-meteorological hazards but, at this broad analysis of feasibility, it is assumed that residual losses after completion of the projects are not included.

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53 Analysis of Climate Change Risks, Impacts and Vulnerability for baseline and projected Climate Change Scenarios: Dr John Chatterton Project Deliverable 1 December 2016
244. The identification of high and very high risk for all 4 hydro-meteorological hazards did not include an assessment of their probability of occurrence, so under Do Nothing it is impossible to predict both the timing and frequency of a damaging event. The timing and frequency are very important when deriving the benefits of resilient mitigation measures: an assumption that a landslide event, for example, in a very high risk location will occur every 10 years on average will give a wholly different Internal Rate of Return for the project than one that is expected to occur every 2 years.

245. The objective of creating structural resilience to infrastructure is not just to ameliorate the effects of major hazards in high and very high risk areas but to resist the degradation of infrastructure over time as increasingly adverse weather events associated with climate change make their use ineffective.

246. For example, a road in a low or medium risk area may degrade (under Do Nothing scenario) over time, reducing access or inhibiting access altogether. This being so, to enable comparison of the relative priority of the cost benefit of all rural road schemes and all flood protection schemes, etc., the Do Nothing losses were assumed for each scheme with the same frequency and timing of occurrence. Thus, the IRRs are relative and not absolute giving a ranking of scheme viability. Developing absolute IRRs will be an important part of appraisal-led design once GCF funding has been allocated. In this analysis costs are broad brush as are benefits.

247. For simplicity, the time horizon for each project is 10 years. It is quite possible that in reality no economic loss would be experienced at the high risk locations within this period (especially landslides), or at least for some schemes. For others, economic loss may be more frequent. What is certain is that the propensity of damaging hydro-meteorological hazards is expected to increase into the future and the theoretical predictions of losses (almost certainly more frequent than in reality) will enable priority ranked projects both nationally for all projects and by project type. The aim of this exercise is to identify likely priority areas for investment which will require further detailed modelling and investigation once GCF funding is secured.

248. Though IRR’s were prioritized for each of the 130 schemes, at this stage the benefits for all 4 project types (rural roads, water supply, irrigation and flood control) were added together. Benefits are summarized as follows:

- Avoided loss of total livelihood by improving irrigation systems, access to water supply, and road quality and connectivity. Livelihood data was derived from the 2015 census data which is based on household surveys. The benefit streams assume that without improvement to infrastructure, loss of total livelihood would be reduced in alternate years.
- Reduced flooding to land and property. Property values are derived from 2015 surveys. Agricultural land at risk was derived from land use data.
- Societal benefits. Impact studies have found that following rehabilitation the roads not only had year-round motorable access, but that travel times had been reduced by 50 percent. Access to services also improved along rehabilitated roads, including 24-hour ambulance service and mobile health services. A conservative uplift factor of 2:1 was used in line with similar appraisals carried out by the World Bank. This is assumed to be US$2/person/year for a total of 28,671 people in the road network area.

249. In environmental project appraisal, benefits may be regarded as monetary benefits expressed in USD, or non-monetary benefits expressed as beneficiaries of the projects (households protected, population benefitting, service areas benefitting — for irrigation systems). Non-monetary benefits are just as significant to justifying project priority as monetary benefits. In theory, all social benefits can be monetised, but not without considerable survey and field investigations.

250. Subsistence farming may be blighted in areas of high erosion with commensurate loss of crop income and general livelihood. An analysis was done within the 6 Municipalities to indicate the potential sites for agroforestry to ameliorate erosion and generate further income for the beneficiaries. No costs and benefits have been derived at this stage. The assumption is that every household has an average size (for subsistence farming) of 1,000 sqm and will be purely for the benefit of adapting subsistence farming practices to reduced loss of crops due to erosion while yielding some wider catchment management benefits. It is not envisaged that large enough economic gain
will be made from these agroforestry schemes to warrant full economic and financial analysis. A total of 92 Ha is estimated within the proximity of households in areas of high erosion, with nearly three quarters falling within Ermera.

251. **Summary of project Economic Viability**
The base line analysis gives an Internal Rate of Return of over 16.2%.

Some explanation of the cash flows is required:

- Annual O&M is included for all projects
- Additional more comprehensive maintenance is included for rural roads in Year 6
- Even without the projects it is uncertain, without significant additional work, as to when water supply would fail. It was assumed that in alternate years there would be no disruption to these services and benefits of improved infrastructure are only included therefore in alternate years
- Social benefits due to better access to markets, education, health, commercial and administrative facilities (assumed to be US$2/person/year).\(^{54}\)
- The four infrastructure bundles were added together to provide a single IRR as each complement the other in safeguarding communities at risk from hydro-meteorological hazards. Cross subsidization of costs between project types enables and overall IRR greater than 10%.

Applying sensitivity tests to the base case as follows in all cases gives an IRR as follows:

- Increasing Costs by 15% gives an IRR of 13.5%
- Decreasing Benefits by 15% gives an IRR of 13.1%
- Increasing Costs by 15% and Decreasing Benefits by 15% gives an IRR of 10.1%

**Summary of Financial Analysis**

252. In accordance with the Guidelines for the Financial Analysis of Projects of United Nations Development Program, the financial analysis has been carried out only for activities and sub-activities that can produce direct and quantifiable benefits in monetary terms, either to the beneficiaries or to the capital providers. As shown in Table 1 above, only Activity 2.2 result in direct quantifiable savings or incremental revenue generation for the beneficiaries and hence only for these activities, the financial analysis has been conducted.

253. The financial analysis is conducted both at the sub-activity level and at the activity level. For instance - the financial analysis, when conducted for Activity 2.2 and its sub-activities, analyses the financial viability of the sub-activities independently before analysing the financial viability of the entire Activity 2.2. This way, the financial analysis shows the Financial returns and viability both at the sub-activity level (Rural Roads, Water Supply, Irrigation Systems, Flood Protection) and at the activity level (Activity 2.2).  

254. Financial Analysis is carried out as two distinct scenarios. Scenario 1 describes a case when the GCF does not participate and when the proposed GCF's capital investments are replaced with loans from Development finance institutions. Scenario 2 describes a case when GCF participates in the form of grant investments and supports the co-financing provided by the Government of Timor Leste (GoTL).

**Key Findings of Financial Analysis – Activity 2.2**

255. The result of the financial analysis for Activity 2.2 is shown in Table 4 below.

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\(^{54}\) World Bank appraisal document for Timor Leste.
Table 4 – Activity 2.2 Financial Analysis

<table>
<thead>
<tr>
<th>Scenario</th>
<th>FIRR (%)</th>
<th>WACC (%)</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario 1) In the absence of participation from GCF, commercial loans are arranged</td>
<td>13.19%</td>
<td>4.91%</td>
<td>$9,584,770</td>
</tr>
<tr>
<td>Scenario 2) GOTL co-financing supported by the GCF participation in the form of grants</td>
<td>13.14%</td>
<td>1.85%</td>
<td>$40,834,588</td>
</tr>
</tbody>
</table>

256. Analysis and Recommendations – Under scenario 1, in which the Grant participation of GCF is replaced with debt funding from commercial finance institutions, it could be noticed that the project investment results in a NPV of $9,584,770, demonstrating the financial viability of the project. The positive NPV is corroborated by the fact that the financial return of 13.19%, as measured by the FIRR, is higher than the Weighted Average Cost of Capital (WACC) of 4.91%. When the commercial loans are replaced with the participation by the GCF in the form of Grants, the project continues to be financially viable with positive FIRR. In this case, the project investment results in a NPV of $40,834,588, which is much higher than the NPV in Scenario 1 and the FIRR of 13.14% is more than the Weighted Average Cost of Capital (WACC) of 1.8%. Taking this and other aspects of financing into consideration, it is recommended that in spite of the positive FIRR profile of the project when funded by development finance loans, GCF participation in the form of grant is much needed for ensuring long-term financial viability and the operational sustainability. Our recommendation is based on the below-mentioned rationale –

257. NO incremental earnings – The benefits from the project accrue to the project owners (GoTL) not in the form of increased income or earning but in the form of expected / prospective savings. The absence of “incremental earning” benefits to the project owners necessitates that the project be supported with non-commercial capital as much as possible for ensuring operational and financial viability over the longer-term.

258. Benefits are Indirect – The benefits from the project accrue to the project owners (GoTL) in the form of potential savings. These savings accrue to the project owners over the long-term and are in the form of losses avoided / spending avoided such as transportation losses avoided due to Climate resilient Rural roads, avoided spending on up-keep of water supply systems etc. The local community and all other participants of the ecosystem along with the project owners enjoy these benefits. This way of realizing benefits necessitates that the project be supported with non-commercial capital as much as possible for ensuring operational and financial viability over the longer-term.

259. Pre-mature economic profile; social and environmental background and challenges – Timor Leste is Asia’s youngest nation and is one of the World’s poorest countries. It’s past has been severely painful with several violence and social unjust. In 1999, upon popular consultation conducted by the UN, there was widespread violence. As much as 70 per cent of the county’s infrastructure was destroyed. Hundreds of thousands of people were left homeless and more than 1,200 were killed. An estimated 230,000 people were forced into the Indonesian territory of West Timor. In 2006, tensions between the national police and the armed forces resulted in open conflict between the two institutions, a breakdown of law and order and the displacement of more than 150,000 people.

260. The country has been under peaceful democracy since 2008 and is focused on infrastructure re-building. Owing to the premature economic profile of the country and viewing the project from the perspective of social and environmental challenges that this low-income country is facing, grant funding will better ensure financial viability and long-term operational sustainability for this project.
261. Regulatory constraints on availing commercial loans by GoTL – The Public Debt Law setout by the GoTL allows only concessional loans to be considered for the purpose of financing strategic infrastructure projects.

262. Practical difficulties in tapping development / commercial finance – Though commercial loans have been presented as an alternative to GCF grants, the ground reality could be starkly different. The concessional loans that are provided by development partners such as JICA, ADB, China EXIM Bank come attached with several riders. These partners could be focused on funding large-scale infrastructure projects of national scale such as Road network up gradation, building large drainage infrastructure than small-scale rural infrastructure projects for climate resilience. Moreover, these projects may contain terms mandating the presence of certain implementation partners. For these practical challenges in availing development / commercial finance, it is recommended that this project be financed by GCF grants.

263. Lack of borrowing program – The financial analysis had explored the possibility of GoTL replacing the GCF grants with more equity in the form of market borrowing. However, Asia’s youngest nation has not established a borrowing program yet and it does not have a currency of its own yet.

264. Sensitivity Analysis – Sensitivity analysis was carried out to determine if increasing the cost of the project or generating less benefits from the investments could derail the financially viability of the project when funded by GCF. Table 5 below shows the results of sensitivity analysis on costs and Table 6 below shows the results of the sensitivity analysis on savings.

<table>
<thead>
<tr>
<th>Activity 2.2 Investment</th>
<th>Scenario</th>
<th>FIRR</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>30,526,600</td>
<td>20% decrease in costs</td>
<td>17.31%</td>
<td>47,904,309</td>
</tr>
<tr>
<td>34,342,425</td>
<td>10% decrease in costs</td>
<td>15.05%</td>
<td>44,369,449</td>
</tr>
<tr>
<td>38,158,250</td>
<td>Base Case</td>
<td>13.1%</td>
<td>40,834,588</td>
</tr>
<tr>
<td>41,974,075</td>
<td>10% increase in costs</td>
<td>11.5%</td>
<td>37,299,727</td>
</tr>
<tr>
<td>45,789,900</td>
<td>20% increase in costs</td>
<td>10.1%</td>
<td>33,764,866</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sensitivity Analysis - Savings</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Savings / Year</th>
<th>Scenario</th>
<th>FIRR</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5 – Activity 2.2 Sensitivity Analysis on Costs

Table 6 – Activity 2.2 Sensitivity Analysis on Savings
Output 2.3 – This activity supports catchment management and rehabilitation measures to enhance climate resilient infrastructure and communities. This activity will scale-up climate resilient catchment management in order to reduce the exposure of communities and their physical assets, such as rural infrastructure to climate-induced hazards. This activity will result in rehabilitated catchment ecosystems, the benefits of which do not accrue direct benefits to the project sponsors, however are “global goods,” benefitting the entire region. Hence, financial analysis is not considered pertinent in this scenario.

### Financial Analysis Conclusion

265. The financial analysis was conducted in accordance with the *Guidelines for the Financial Analysis of Projects of United Nations Development Program*. The financial analysis has been carried out only for activities and sub-activities that can produce direct and quantifiable benefits in monetary terms, either to the beneficiaries or to the capital providers. Activity 2.2 qualifies as such activities with direct and quantifiable costs and benefits. In monetary terms, these activities contribute to 63% of the total project spending/allocation and hence can be considered as a comprehensive indicator of financial analysis on the project itself. Two scenarios were considered - Under scenario 1, in which the Grant participation of GCF is replaced with debt funding from commercial finance institutions, it could be noticed that the project resulted in a substantially lower NPV of $9,584,770 in comparison to Scenario 2, which yielded substantially higher NPV of $40,834,588. The financial analysis also considered factors such as nature of project benefits, economic profile and situation of Timor Leste, regulatory and fiscal constraints while arriving at a recommendation. Taking all these aspects of financing into consideration, it is recommended that in spite of the positive FIRR profile of the project when funded by development/commercial loans, GCF participation in the form of grant is much needed for ensuring long-term financial viability and the operational sustainability.

### F.2. Technical Evaluation

266. The project supports the integration of climate change considerations into the development of climate resilient small-scale rural infrastructure that will, in turn, provide essential services to local communities. It is embedding such climate change considerations within the current infrastructure planning framework and strengthening the climate risk management capacity at the same time. The proposed project is technically viable as it consolidates field proven methods and practices and implements at a scale that is important for transformation of small scale rural infrastructure development in the target municipalities, while providing a strong basis for national scaling up and replication.
267. Risk Knowledge. A key foundational activity of the project will be the strengthening of the climate risk knowledge base for the whole of Timor Leste for the major hazards. This will be done through the introduction of modern assessment, modelling and mapping techniques and tools not currently available in Timor Leste. Climate hazard, risk and vulnerability information currently available for Timor Leste is of a broad-brushed nature and does not provide the level of detail required for making risk informed decisions, nor for designing climate resilient infrastructure. ALGIS - The Agriculture and Land-use Geographic Information System (ALGIS) within the Ministry of Agriculture and Fisheries (MAF), established by FAO maintains 12 automatic weather stations in Timor Leste. Information from these stations is collected and used for climate variable reporting. In addition, Seeds of Life (SoL) maintains a wide network of automatic weather stations and is upgrading the hydrometric network. They share data with the National Directorate for Meteorology and Geophysics (NDMG) and maintain a hydrometric database. The limitations of the hydrometric network in Timor Leste are being addressed by these organisations and also other entities that are supporting the government to enhance the observation network. Given that the main objective of the GCF project is to protect the physical assets and livelihoods of the rural population from the effects of climate change, the upgrade of the hydrometric network falls outside of project’s scope. However, the project is putting into place capacities for hydrological assessment, which includes innovative methods of using drones for the assessments. The project is thus supporting the generation and use of the hydrometric data by developing the risk data and knowledge which will inform and will be incorporated into the design, construction and operation and maintenance of climate resilient small-scale rural infrastructure. Furthermore, the project will introduce modern and proven modelling approaches in line with international best practices and will utilize the best available physical, hydrometeorological and socio-economic data available for Timor Leste. Modern modelling software will be introduced for all hazards and a review of data availability for Timor Leste confirmed that the methods are appropriate for the data available.

268. Hazard, risk and vulnerability mapping. Hazard, risk and vulnerability maps are essential for the assessment of current and future hazards and the design of hazard management solutions that fully accounts for climate change considerations and the identification of receptors such as infrastructure at risk. The strategic assessment of risk to population, infrastructure, economic activity and to future development under conditions of climate change is a government priority to support and guide municipalities to wisely and rationally manage risk exposure to acceptable levels. GCF resources will be used to introduce modelling technologies to develop hazard maps under current and climate change conditions for the whole country and for all hazards. The hazard and risk maps will be used to make risk-informed decisions for all aspects of development and risk management in the future. This will include zoning of development activity away from high-hazard areas to avoid physical damages to people and property and losses to economic activity. In addition, the hazard maps will be used as the basis of the multi-hazard early warning system to be developed in the future and will be used by national and local authorities and communities in the development of emergency preparedness and response plans. Furthermore, these maps could be used in the establishment of different financial risk transfer mechanisms and for raising public awareness and improving community preparedness. The visual maps will benefit decision makers and all involved in natural hazard risk management at the national and local level. They will also enable government and donor agencies to better focus their efforts in dealing with hazards in the basin in the future. Importantly the hazard maps will provide the basis for the management of climate-induced hydrometeorological hazards in Timor Leste now and in the future.

269. Disaster Risk Management and asset management. The implementation and maintenance of modelling systems and the full adoption of the new technologies to be introduced will require technical capacities in all areas of hazard and disaster risk management to ensure their long-term sustainability. Some technical skills and competencies exist in governmental and non-governmental institutions in areas that contribute to risk reduction and disaster management and emergency response. There are good capacities to elaborate long-term development policies, strategies and plans in various sectors. This however is mostly the case at central level, rather than decentralized levels (regional, municipal and local). While technical expertise exists in various sectors and for specific technical areas, knowledge of hazard modelling and risk reduction concepts and practices is an area for improvement. Technical capacities related to hazard identification, risk identification and assessment, prevention, risk reduction, risk mitigation, risk transfer, preparedness, climate risk management and climate change adaptation are rather weak across institutions and governance levels. In certain sectors, there are insufficient human resources; in many cases, incentives for specialized education or training are lacking, and qualified staff turnover is high. As part of the SSRI project, an assessment was made of the existing gaps in institutional capacity for all aspects of hazard
and risk management in Timor Leste. A capacity development plan will be specified based on the needs identified. In addition to hazard maps for individual hazards, a multi-hazard map (MHM) will be developed for all major river basins in Timor Leste. This is an excellent tool to create awareness in mitigating multiple inter-related hazards and for assessing vulnerability and risk, especially when combined with the mapping of critical facilities. It is also useful in infrastructure design and construction, particularly in a country like Timor Leste where small-scale infrastructure in a given area can be susceptible to multiple hazards, all of which can be triggered by the same set of long-term/creeping conditions as well as single events.

270. Damage and loss recording. The project is also introducing modern approaches to assessment of economic damages (through socio-economic risk modelling of the underlying hazard impacts), and damage and loss assessment and monitoring technologies. In particular, the project will have introduced drone technology to enhance the identification of disaster impacts and speed up mobilization of response in order to reduce causalities. The use of UAV’s will assist in early pinpointing of crisis points and avoid the frustration of blocked access in the immediate aftermath of a disaster. There are concerns at National Disaster Operations Center (NDOC) regarding the speed of the rapid assessment process, which can take up to 2 weeks (while the recovery package can take “many months”). Reasons given for such delay are remoteness, distance, and inadequate communication systems (though smart phones are being increasingly used to phone in data). The biggest threats were felt to be poor communication services and poor sharing and quality of data. Double entry and inadequate auditing to filter out misleading or poor data are common challenges. In all, 442 sucos would benefit from a real-time validation process with a robust quality assurance system. Based on this, the support of drone systems in disaster management was fully recognised as a support system. The use of drones, or unmanned aerial vehicles (UAV), can significantly enhance risk and damage assessments and revolutionize disaster preparation, response, and management capacities in the future. The deployment of drones will be aimed at supporting the government’s response planning activities and strengthen the preparation for and response to disasters including the assessment of physical damages for post disaster needs assessment. It will also help in making better-informed decisions in protecting livelihoods. Data generated from the drone flights will also be useful in the long-term monitoring of hazards, which will feed into the continued updating of hazard and risk information used in climate risk management, design of climate resilient infrastructure, and environmental monitoring. Drones equipped with photogrammetric and navigation equipment will be used to allow rapid and reliable assessments of important hazard parameters. In addition, a Risk Management Application (DRMApp) will be developed to support the DRM operations.

271. Climate proofing infrastructure. The 130 infrastructure projects were subject to a cost-benefit analysis. Capital, operational (where appropriate), and maintenance costs were provided for each project, and the Internal Rate of Return calculated based on monetised benefits relating to the avoidance of economic losses to communities (Sucos) assuming no resilience measures were put in place (The Do-Nothing option). The time horizon for each project is 20 years. Cash Flow spreadsheets were developed to indicate the broad scale Internal Rate of Return (IRR) for each project comparing total costs (capital and periodic and annual maintenance) with the benefits as defined by the economic indicators. IRR’s are calculated for all costs, capital costs only, and economic indicators representing elimination of potential losses associated with improved climate resilient infrastructure. On this basis, the projects were ranked – both for all projects in all municipalities and for each individual project type - to indicate where project investments are worth value for money.

272. Evaluation of the cost of Climate-Proofing Infrastructure. In certain countries of the region with complex terrain, the cost of “building in” climate resilience into roads projects is estimated to add 15-25% to the total project costs. However, the additional costs would nullify in 7 to 9 years due to lower maintenance costs over the long-term. This means that climate resilient roads would be much cheaper than conventional roads overall. Under the SSRI project, 3 climate resilient rural road rehabilitation projects were implemented in 2016 at an average cost of around $63,658 USD per km ($493,225/7.748 km). The investment for the complementary soil bioengineering interventions was between 3 – 5 % of the contract cost. Assuming a value of 10% of the cost, it can be estimated that the additional cost of climate-proofing roads is 1,474,152 or $6,890 USD per km. For water supply systems, the total investment cost per capita under the SSRI project was $75/person and provides approximately 15 years’ service life. Considering only the total investment cost, this yields a simple average of $5.00 per person per annum for 12,775 m3 @35 litres/person/day which works out to approximately = $0.39 per cubic meter per year at constant supply. Since most of these systems are gravity-fed, operational expenses are minimal, as are maintenance costs. Hence
the proposed GCF project will provide 10.3 Million cubic meters per year of constant supply. This represents a guaranteed water supply in areas where there is currently no or irregular supply, and where clean supply is at risk from drought, erosion, flooding and landslides. Under the SSRI project, 2 irrigation schemes were implemented, covering 110 ha of irrigated land, at a total cost of $294,613.67 USD and 5,238 beneficiaries. It is estimated that the annual rice production for areas producing single crop per year is 1.5 MT per ha on average. The proposed GCF project could therefore result in 5,550 Mt per ha per year more rice production. This represents a more stable rice production in areas where variable production is being exacerbated by drought and prolonged dry seasons.

273. Ecosystem based catchment management. In addition to the climate proofing measures that will be implemented for all types of infrastructure in the target priority locations, the project is also implementing an ecosystem based approach to catchment management for the subject catchments to enhance the protection of the infrastructure within these catchments. This includes the use of agroforestry. Agroforestry is a combination of agricultural and forestry technologies to create integrated, diverse and productive land use systems (Garrett and Agus, 2000). While agroforests are typically less diverse than native forest, they do contain a significant number of plant and animal species. This diversity can, in time, provide ecological resilience and contribute to the maintenance of beneficial ecological functions. Similar to plantation forests, agroforests can help relieve some of the pressure to harvest native forests. Agroforestry is a collective name for land-use systems and technologies where woody perennials (trees, shrubs, palms, bamboos, etc.) are deliberately used on the same land-management units as agricultural crops and/or animals, in some form of spatial arrangement or temporal sequence. Agroforestry systems play an important role in conservation of natural resources, especially soil. Adoption of agroforestry practices enhances the productivity of resource-poor small and marginal farmers. Agroforestry has both productive and service functions. Among the productive functions, fuel wood, fodder and fruit are the most important besides construction wood, gums, resins, medicines, fibres. In addition, these productive uses contribute to food security. The service functions include shade, reduction in wind speed, control of erosion and maintenance and improvement of soil fertility. Agroforestry systems increase nutrients inputs through nitrogen fixing trees and nutrient uptake from deep soil horizons. They reduce nutrient leaching losses through tree root and mycorrhizal systems. Agroforestry systems recycle nutrients through decomposition of litter, pruning and root residues. In agroforestry systems, there are both ecological and economical interactions between the different components.

274. Agro-forestry and reforestation will be implemented in the catchments upstream of the infrastructure to reduce soil erosion and landslide risks downstream, thus adding an additional layer of protection and lengthening the service life of the infrastructure. The project will assist the MAF in developing the agroforestry and reforestation strategy and specific implementation procedures for the sub-catchments within which the infrastructure projects will be located. The strategy uses detailed hazard mapping to be developed by the project (Activity 1.1) for identifying priority areas for agroforestry and reforestation intervention, specifically targeting areas that will compromise the infrastructure due to climate change related hazards.
F.3. Environmental, Social Assessment, including Gender Considerations

275. This project has completed the UNDP social and environmental screening procedure (see SESP attached as Annex VIa). This screening was undertaken to ensure this project complies with UNDP’s Social and Environmental Standards. The overall social and environmental risk category for this project is: moderate.

276. The project is expected to have some short term small- to medium-scale environmental impacts particularly in relation to the rehabilitation of existing infrastructure but will have significant long lasting environmental benefits (See Section E.3.1). The project will rehabilitate/build irrigation infrastructure, roads and bridges, and flood control structures and will introduce agro-forestry into degraded areas to allow for resilience.

277. The project will also improve the capacity of government and communities to plan, design, and deliver rural infrastructure that is climate resilient. Guiding documents such as manuals, checklists, and standards will be reviewed and updated to support improved planning and implementation.

278. Key considerations in minimising environmental and social impacts during the project are outlined in the ESMF, but include social inclusion and consultation, sediment and erosion control, and health and safety for workers and community.

279. Physical impacts will be primarily associated with construction. These impacts will generally be minor and of a temporary nature. The implementation of the ESMF will ensure that these impacts are satisfactorily managed.

280. Project interventions will be undertaken in areas of Timor Leste where communities are particularly vulnerable to the impacts of climate change. These communities are largely rural and often have constrained or marginal livelihood opportunities.

281. The project has been designed with attention paid to gender and social inclusion considerations. The gender analysis undertaken at the project design phase, acts as an entry point for gender mainstreaming throughout implementation, and builds on stakeholder consultation, existing analytical documentation and data from projects currently being implemented, and national statistics where available. The project design takes into consideration a number of key gender implications, including (among other things), women’s critical role in agriculture and food security; analysis of the gendered division of labour; women’s access to and control over environmental resources; identification of gender equality gaps.

282. During project implementation, qualitative assessments will be conducted on the gender-specific benefits that can be directly associated with the project. This will be incorporated into the annual Project Implementation Report, Mid-term Report, and Terminal Evaluation. Indicators to quantify the progress of project objectives in relation to gender equality are included in the Gender Action Plan.

F.4. Financial Management and Procurement

283. The financial management and procurement of this project will be guided by UNDP financial rules and regulations available here. Further guidance is outlined in the financial resources management section of the UNDP Programme and Operations Policies and Procedures available here. UNDP has comprehensive procurement policies in place as outlined in the Contracts and Procurement' section of UNDP’s Programme and Operations Policies and Procedures (POPP). The policies outline formal procurement standards and guidelines across each phase of the procurement process, and they apply to all procurements in UNDP. See here: https://popp.undp.org/SitePages/POPPSubject.aspx?SBJID=211&Menu=BusinessUnit

284. The project will be implemented following the National Implementation Modality (NIM) following NIM guidelines available here. UNDP will ascertain the national capacities of the Implementing Partner/Executing Entity by
undertaking an evaluation of capacity following the Framework for Cash Transfers to Implementing Partners/Executing Entities (part of the Harmonized Approach to Cash Transfers - HACT). All projects will be audited following the UNDP financial rules and regulations noted above and applicable audit guidelines and policies.

285. The NIM Guidelines are a formal part of UNDP’s policies and procedures, as set out in the UNDP Programme and Operations Policies and Procedures (POPP). The NIM Guidelines were corporately developed and adopted by UNDP, and are fully compliant with UNDP’s procurement and financial management rules and regulations.

286. The national executing entity, MCIE - also referred to as the national ‘Implementing Partner’ in UNDP terminology - is required to implement the project in compliance with UNDP rules and regulations, policies and procedures (including the NIM Guidelines). In legal terms, this is ensured through the national Government’s signature of the UNDP Standard Basic Assistance Agreement (SBAA), together with a UNDP project document which will be signed by the Implementing Partner to govern the use of the funds. Both documents require compliance.

287. National Implementing Partner and all three Responsible Parties have undergone a Harmonized Approach to Cash Transfer (HACT) assessment by UNDP. Due to a time bound rule of validity additional micro assessments may be required during the project lifetime. During implementation, UNDP will provide oversight and quality assurance in accordance with its policies and procedures, and any specific requirements in the Accreditation Master Agreement (AMA) and project confirmation to be agreed with the GCF. This may include, but is not limited to, monitoring missions, spot checks, facilitation and participation in project board meetings, quarterly progress and annual implementation reviews, and audits at project level or at Implementing partner level on the resources received from UNDP.

288. The Harmonized Approach to Cash Transfer (HACT) framework consists of four processes, namely: i) macro assessments; ii) micro assessments; iii) cash transfers and disbursements; and iv) assurance activities. Assurance activities include planning, periodic on-site reviews (spot checks), programmatic monitoring, scheduled audits and special audits. During micro-assessment, there can weaknesses identified for which actions are required to addresses the gaps. When a spot check finds that the gaps are not addressed it will mean that the level of assurance activities will have to remain higher and modalities of engaging with that implementing partner will have to be reviewed if necessary. All details are available here: https://popp.undp.org/SitePages/POPPSubject.aspx?SBJID=167&Menu=BusinessUnit.

289. The project will be audited in accordance with UNDP policies and procedures on audits, informed by and together with any specific requirements agreed in the AMA. According to the current audit policies, UNDP will be appointing the auditors. In UNDP scheduled audits are performed during the programme cycle as per UNDP assurance/audit plans, on the basis of the implementing partner's risk rating and UNDP's guidelines. A scheduled audit is used to determine whether the funds transferred to the implementing partner were used for the appropriate purpose and in accordance with the work plan. A scheduled audit can consist of a financial audit or an internal control audit.

290. All GCF resources will be provided to the executing entity, less any agreed cost recovery amount. Under UNDP’s national implementation modality, UNDP advances cash funds on a quarterly basis to the executing entity for the implementation of agreed and approved programme activities, in accordance with UNDP standard policies and the NIM Guidelines. The executing entity reports back expenditure via a financial report on quarterly basis to UNDP. Any additional requirements will be as in accordance with the AMA.
G.1. Risk Assessment Summary

SAFEGUARDS RELATED

291. Environmental and social risks relate primarily to the potential impacts of construction activities. These include: the potential disturbance or damage of habitats; sediment and erosion; catchment-wide impacts of agro-forestry; and construction safety (workers and public).

292. Agro-forestry activities can have potential negative impacts if poorly planned and managed e.g. if incorrect species are used, over-harvesting occurs, if soil erosion is not managed, if natural areas are cleared for agro-forestry purposes. However, potential benefits also exist both in terms of social capital (livelihoods) and ecosystem services/catchment management.

293. Women in Timor Leste are particularly vulnerable and there is a risk that this is not adequately addressed. The project incorporates measures to foster the empowerment of women through their inclusion, involvement and education. Providing opportunities for livelihood enhancement to women is a valuable aspect of the project.

G.2. Risk Factors and Mitigation Measures

Please describe financial, technical and operational, social and environmental and other risks that might prevent the project/programme objectives from being achieved. Also describe the proposed risk mitigation measures.

<table>
<thead>
<tr>
<th>Selected Risk Factor 1</th>
<th>Description</th>
<th>Risk category</th>
<th>Level of impact</th>
<th>Probability of risk occurring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Political instability or regional conflicts</td>
<td>Other</td>
<td>High (&gt;20% of project value)</td>
<td>Low</td>
<td></td>
</tr>
</tbody>
</table>

Mitigation Measure(s)

The project will develop and implement an emergency management/contingency plan in line with UNDP CO’s crisis management requirements. This may reduce the level of impact of the risk to medium to low level.

<table>
<thead>
<tr>
<th>Selected Risk Factor 2</th>
<th>Description</th>
<th>Risk category</th>
<th>Level of impact</th>
<th>Probability of risk occurring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project-implemented infrastructure is destroyed by catastrophic hazardous event</td>
<td>Social and environmental</td>
<td>High (&gt;20% of project value)</td>
<td>Low</td>
<td></td>
</tr>
</tbody>
</table>

Mitigation Measure(s)

The project will develop and implement an emergency management/contingency plan in line with UNDP CO’s crisis management requirements. During the design and construction of relevant infrastructure, disaster risks will be taken into consideration and climate proofing elements will be included in all stages of design and construction. These activities will reduce the level of impact from hazardous events and lower the probability that the infrastructure will be destroyed to the minimum level.
### Selected Risk Factor 3

<table>
<thead>
<tr>
<th>Description</th>
<th>Risk category</th>
<th>Level of impact</th>
<th>Probability of risk occurring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced government priority for climate change adaptation and DRR due to political, financial and technical re-focus, resulting in reduced ability to fully embed infrastructure climate proofing and DRR intervention measures into policies and enabling frameworks.</td>
<td>Technical and operational</td>
<td>Medium (5.1-20% of project value)</td>
<td>Low</td>
</tr>
</tbody>
</table>

**Mitigation Measure(s)**

The project will have constant consultations with high-level government representatives and will carry out lobbying and advocacy campaigns in support of CC adaptation and DRR. This will reduce the impact of the risk to the minimum level.

### Selected Risk Factor 4

<table>
<thead>
<tr>
<th>Description</th>
<th>Risk category</th>
<th>Level of impact</th>
<th>Probability of risk occurring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absorption and operational capacities of project responsible parties are inadequate to properly implement climate-proofing of infrastructure and management of disaster risk beyond the project</td>
<td>Technical and operational</td>
<td>Medium (5.1-20% of project value)</td>
<td>High</td>
</tr>
</tbody>
</table>

**Mitigation Measure(s)**

The project will pay close attention to the capacity building of all relevant agencies through carrying out a training of trainers, conducting on-the-job and field trainings of the staff of relevant agencies, introducing/strengthening internships within responsible parties and particularly municipalities, and developing technical guidelines and methodologies for the sustainable design, construction and maintenance of climate resilient infrastructure. Capacity building throughout the project will reduce the probability and impact of this risk to the minimum level.

### Selected Risk Factor 5

<table>
<thead>
<tr>
<th>Description</th>
<th>Risk category</th>
<th>Level of impact</th>
<th>Probability of risk occurring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Due to poor financial performance of the government, and particularly ministries and agencies engaged in the project as responsible parties, significant budget and staff cuts occur in these state organizations.</td>
<td>Financial</td>
<td>Medium (5.1-20% of project value)</td>
<td>Medium</td>
</tr>
</tbody>
</table>

**Mitigation Measure(s)**

The project will assist government authorities to develop and implement sustainable long-term financial planning for the design and implementation of climate resilient infrastructure, including identification of potential private sector contributors and accessing international donor financing.
### Selected Risk Factor 6

<table>
<thead>
<tr>
<th>Description</th>
<th>Risk category</th>
<th>Level of impact</th>
<th>Probability of risk occurring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local communities are not interested in being engaged in community-based</td>
<td>Social and</td>
<td>Low (&lt;5% of project value)</td>
<td>Low</td>
</tr>
<tr>
<td>agro-forestry and reforestation activities for enhanced catchment</td>
<td>environmental</td>
<td>Low (&lt;5% of project value)</td>
<td></td>
</tr>
<tr>
<td>management</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Mitigation Measure(s)**

The project will conduct extensive awareness campaigns at the grassroots’ level on climate-induced natural hazards, vulnerabilities, and risks. In addition, the benefits of reducing these risks to infrastructure by implementing agro-forestry, reforestation and catchment management will be highlighted. Awareness raising will be based on tried and trusted methods of community engagement established by the existing SSRI project. The project will also make significant efforts to mobilize and empower local communities in the implementation of community-based agro-forestry. This will reduce the impact and probability of the risk to the minimum level.

### Selected Risk Factor 7

<table>
<thead>
<tr>
<th>Description</th>
<th>Risk category</th>
<th>Level of impact</th>
<th>Probability of risk occurring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agro-forestry implemented on land previously used primarily for agriculture.</td>
<td>Social and</td>
<td>Low (&lt;5% of project value)</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>environmental</td>
<td>Low (&lt;5% of project value)</td>
<td></td>
</tr>
</tbody>
</table>

**Mitigation Measure(s)**

Stakeholder consultation will be undertaken prior to the final selection of agroforestry sites within the infrastructure catchments to minimise conflicts with pasture land. The economic benefits to communities from implementing agro-forestry - from protecting infrastructure and agricultural land to the environmental and ecological benefits of overall catchment rehabilitation - are expected to be higher than opportunity costs related to current agricultural yields from the already degraded land.

### Other Potential Risks in the Horizon

N/A
H.1. Logic Framework.
Please specify the logic framework in accordance with the GCF’s Performance Measurement Framework under the Results Management Framework.

H.1.1. Paradigm Shift Objectives and Impacts at the Fund level

**Paradigm shift objectives**

The project objective is to safeguard vulnerable communities and their physical assets from climate change-induced disasters by addressing existing institutional, financial and legislative barriers, and increasing the climate resilience of vulnerable small-scale rural infrastructure. Strengthening the capacity of mandated institutions to assess and manage climate risks in order to maintain local infrastructure services. It will embed new skills, technologies, and innovative methods in climate risk identification and mitigation processes, enhance monitoring and recording of climate risk information and integrate climate risk data into policies, standards, guidelines, and long-term investment planning for small-scale rural infrastructure, and will implement climate resilient building measures to improve small-scale rural infrastructure in vulnerable areas. To further safeguard climate proofed infrastructure, the project will develop and implement catchment management strategies, supporting long-term resilience and climate risk reduction via landscape restoration and enhanced land stability, particularly in vulnerable catchments where small-scale infrastructure is present. The project targets 175,840 direct beneficiaries, an estimated 15% of the total population and will catalysed benefits including increased climate resilience for small-scale infrastructure as well as 1500 ha of reforested and rehabilitated land to buffer against climate-induced disasters. The project will ensure long-term infrastructure resilience via (i) embedding climate resilience standards into the processes through which small-scale infrastructure is planned, designed, constructed and maintained; (ii) improving climate hazard and risk assessment capacity and access to climate risk information.

<table>
<thead>
<tr>
<th>Expected Result</th>
<th>Indicator</th>
<th>Means of Verification (MoV)</th>
<th>Baseline</th>
<th>Target</th>
<th>Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A1.0 Increased resilience and enhanced livelihoods of the most vulnerable people, communities, and regions</td>
<td>A1.1 % reduction in losses of lives and economic assets (US$) due to the impact of extreme climate-related disasters in the geographic area of the GCF intervention</td>
<td>MSA D&amp;L database</td>
<td>Economic loss exposure equivalent to 11.5% of GDP</td>
<td>Mid-Term – 25% reduction in economic losses in 6 target municipalities</td>
</tr>
</tbody>
</table>

**Assumptions**

Climate proofing, asset management and maintenance and DRM interventions result in target reduction in economic losses.

55 Information on the Fund’s expected results and indicators can be found in its Performance Measurement Frameworks available at the following link (Please note that some indicators are under refinement): [http://www.greenclimate.fund/documents/20182/239759/5.3_-_Performance_Measurement_Frameworks__PMF__.pdf](http://www.greenclimate.fund/documents/20182/239759/5.3_-_Performance_Measurement_Frameworks__PMF__.pdf)
### A3.0 Increased resilience of infrastructure and the built environment to climate change

<table>
<thead>
<tr>
<th>A3.1 total number of infrastructure units made climate resilient</th>
<th>MSA asset database</th>
<th>13 units per year non-climate proofed infrastructure in each of the 6 target municipalities</th>
<th>Mid-term - 31 climate resilient infrastructure assets built or improved by project</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Central government, Municipalities, and community members are willing and able to scale up climate-resilient infrastructure design and development practices.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A3.1 total number of beneficiaries with access to climate resilient infrastructure units</th>
<th>MSA asset database</th>
<th>33,000 beneficiaries in 3 of the target municipalities where SSRI has been implemented</th>
<th>Mid-term – 75,000 beneficiaries direct beneficiaries (51% male, 49% female) of the 31 climate resilient infrastructure assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final - 175,840 direct beneficiaries (51% male, 49% female) of the 130 climate resilient infrastructure assets</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### A4.0 Improved resilience of ecosystems and ecosystem services

<table>
<thead>
<tr>
<th>A4.1 Extent of ecosystems strengthened, restored and protected from climate variability and change</th>
<th>MAF database showing number of hectares under agroforestry and reforestation</th>
<th>Deforestation rate of 1.16% per year</th>
<th>Mid-term – 100 ha of farm and state land is under agroforestry and reforestation efforts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final - 300 ha of farm and state land is under agroforestry and reforestation efforts</td>
<td></td>
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<td></td>
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</tbody>
</table>

### A.1.2 Outcomes, Outputs, Activities and Inputs at Project/Programme level

<table>
<thead>
<tr>
<th>Expected Result</th>
<th>Indicator</th>
<th>Means of Verification (MoV)</th>
<th>Baseline</th>
<th>Target</th>
<th>Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Central government, Municipalities, and community members are willing and able to scale up climate-resilient infrastructure design and development practices.</strong></td>
<td></td>
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</tr>
</tbody>
</table>

56% of assets will be implemented using government co-financing
<table>
<thead>
<tr>
<th>Project/programme outcomes</th>
<th>Outcomes that contribute to Fund-level impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>A5.0 Strengthened institutional and regulatory systems for climate responsive planning and development</td>
<td>A 5.1 # of Institutional and regulatory systems that improve incentives for climate resilience and their effective implementation</td>
</tr>
<tr>
<td>A7.0 Strengthened adaptive capacity and reduced exposure to climate risks</td>
<td>A7.1: Use by public-sector services staff of Fund supported tools, instruments, strategies and activities to respond to climate change and variability</td>
</tr>
<tr>
<td>A7.0 Strengthened adaptive capacity and reduced exposure to climate risks</td>
<td>A 7.2 # of males and females reached benefitting from climate-resilient infrastructure.</td>
</tr>
<tr>
<td>A7.0 Strengthened adaptive capacity and reduced exposure to climate risks</td>
<td>Gender-sensitive field surveys undertaken within the targeted sub-catchments and districts.</td>
</tr>
<tr>
<td>Project/programme outputs</td>
<td>Outputs that contribute to outcomes</td>
</tr>
<tr>
<td>--------------------------</td>
<td>------------------------------------</td>
</tr>
<tr>
<td>1. Climate risk information is developed, monitored and integrated into policies, regulations and institutions to inform climate resilient small-scale rural infrastructure planning and management</td>
<td>1.1 # of hazard risk maps and information developed and adopted/ embedded into sectoral policies and legislations</td>
</tr>
<tr>
<td></td>
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<td></td>
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<tr>
<td></td>
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</tr>
<tr>
<td></td>
<td>2. Climate risk reduction and climate-proofing measures for small-scale rural infrastructure are implemented to build the resilience of vulnerable communities in six priority districts</td>
</tr>
<tr>
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<td></td>
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<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

^57 49% of assets will be implemented using government co-financing
Agroforestry introduced to local communities will lead to alternative sustainable CR livelihoods that lead to reduced land degradation.

Government commitments to secure adequate O/M of 130 infrastructure units are fulfilled on a continuous basis both during the project implementation and afterwards.

Capacities built across relevant local government organisations through the project are maintained and periodically updated.

Relevant government agencies cooperate on development and implementation of CR infrastructure (MSS, MAF, MCJE, MPWTC etc.).

### Activities

<table>
<thead>
<tr>
<th>Activities</th>
<th>Description</th>
<th>Inputs</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1. Develop and deliver climate risk information services and vulnerability mapping to all sectoral institutions | This activity includes data generation and analysis, modelling, production of hazard, risk and vulnerability mapping and related training and capacity. This activity will develop risk modelling and actionable risk information production capacities by implementing the following: 1.1.1. Establish a project Spatial Data Infrastructure (SDI) and provide project GIS support throughout. | 1 International and 1 national GIS consultant to develop and establish SDI, Consultants, Contractors, Training, Workshops and conferences | Setting up of the project GIS (SDI system), engagement of national expert, travel-related costs, data review and data modelling inputs, GIS work, printing and production of reports and maps; project management.  
Data gathering and organisation into project GIS (SDI system), various data gathering, physical (e.g. topographic and geological) surveys. Survey teams (contractors)  
Input will include cost of local and international experts, MSS staff, travel-related costs, GIS work, printing and production of reports and maps; project management.  
Flood hazard and risk maps will be developed in line with international best practice. Accurate digital elevation models (DEM) in the form of LiDAR will be used for all modelling. Topographic survey of rivers through high risk areas will be undertaken. Historical hydro-hydrometric data for all Timor Leste |
| 1.1.2 Data gathering, data digitisation systematization, storage and analysis within the SDI GIS system for use in hazard and risk analyses to support the hazard and risk modelling and mapping. Undertake detailed surveys for all hazard modelling | 2x Consultants for surveys, TOT Training | Data gathering and organisation into project GIS (SDI system), various data gathering, physical (e.g. topographic and geological) surveys. Survey teams (contractors) |
| 1.1.3 Procure modelling software, databases, hardware for multi-hazard modelling to be embedded in MSS | Purchase of software for hazard, risk and vulnerability modelling and mapping | Purchase of modelling software for hydrological (flood and drought), hydraulic (flood), erosion modelling |
| 1.1.4 Using the most appropriate modelling techniques, establish numerical models for flood modelling, landslide and erosion and drought for all major river basin in TL based on surveys of the physical characteristics of the river basins. Produce high resolution hazard maps | International and national consultants to provide TA to undertake hazard, modelling and mapping. | Input will include cost of local and international experts, MSS staff, travel-related costs, GIS work, printing and production of reports and maps; project management. Flood hazard and risk maps will be developed in line with international best practice. Accurate digital elevation models (DEM) in the form of LiDAR will be used for all modelling. Topographic survey of rivers through high risk areas will be undertaken. Historical hydro-hydrometric data for all Timor Leste required for all hazard and risk assessments will be utilized. |
| 1.1.5 Deliver training in hazard modelling to at least 20 practitioners at national and local government level and identify long-term training needs | Training, TOT training. | Training workshops for MSS practitioners |
| 1.1.6 Develop and codify methods and tools for undertaking socio-economic surveys to collection necessary information to fully map the socio-economic conditions of the rural poor within the catchment; Using the methods developed, undertake detailed socio-economic surveys for 6 target municipalities in TL | Socio-economic vulnerability survey methods and tool development | Input will include cost of local and international experts, travel-related costs, cost of international experts. Development of the risk and vulnerability surveying tool. |
| 1.1.7 Undertake socio-economic and vulnerability assessment to fully map existing vulnerability within TL | Socio-economic vulnerability surveys | Engagement of teams to undertake socio-economic surveys |
| 1.1.8 Develop a GIS-based tool to integrate various spatial socio-economic data with the hazard maps, perform vulnerability assessment, produce vulnerability maps which will include damages and loss of life estimates and to test risk management interventions options. Tools, methods, guidelines and procedures for recording disaster events, undertaking post-event surveys | Development of risk, vulnerability, and CBA tool | Input will include cost of local and international experts, travel-related costs, cost of international experts. Development of the GIS-based risk and vulnerability modelling tool based on hazard data, physical data (receptor data), socio-economic data from new survey methods |
| 1.1.9 Develop and deliver a training programme in socio-economic modelling methods and tools to MSS staff | Training in socio-economic modelling methods and tools | Training of MSS and municipality staff in socio-economic survey tools (workshops) and engagement of teams to undertake socio-economic surveys |

1.2. Establish a database system for monitoring, recording and accounting climate induced damages in order to inform climate risk reduction planning and budgeting

This activity includes strengthening systems for monitoring and recording climate induced disaster events. Estimation of the economic damages caused by climate change induced events and establish a database management system to monitor damages over time.

Review of all damage and loss accounting systems, design and development of a harmonised/unified system. This will be delivered by implementing the following:

1.2.1 Procure 6 Drones and deliver (how many) user training

Hover Drones x 6 (1 per pilot Municipality) Fixed wing Drone x 1. including training and spare parts

Development of DRMapp (functionality will include mature knowledge management with inventory, reporting and feedback); Data Processing of Hover Data (4 times per year times 2 weeks each pass assumed); Fixed data (In house expert; 4 times per year)

Input will include cost of local and international experts, travel-related costs, cost of international experts. Development and implementation of unified damage and loss accounting system
### 1.2.2 Review of existing damage and loss databases and accounting technologies

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review of existing damage and loss databases and accounting technologies</td>
<td>International and national consultants to develop and implement a</td>
</tr>
<tr>
<td>(Disaster Risk Management Portal, SIGAS accounting system, and Desinventar</td>
<td>harmonized and unified damage and loss recording and accounting system</td>
</tr>
<tr>
<td>database). Development and implementation of a harmonized and unified</td>
<td>in the form of a Disaster Risk Management Application (DRMApp) which</td>
</tr>
<tr>
<td>damage and loss recording and accounting system in the form of a Disaster</td>
<td>will provide a real-time system to track disparate reporting. Available</td>
</tr>
<tr>
<td>Risk Management Application (DRMApp) which will provide a real-time system</td>
<td>at National sub-national and municipal and suco level. DRMApp will</td>
</tr>
<tr>
<td>to all tracking the observation data, verification data and compensatory</td>
<td>include development of electronic (online, mobile handheld proformas etc.)</td>
</tr>
<tr>
<td>responses, including a Metadatabase to collate and track disparate</td>
<td>and manual damage and loss recording templates</td>
</tr>
<tr>
<td>reporting.</td>
<td></td>
</tr>
</tbody>
</table>

Includes collection of asset register datasets, validation, data cleansing,
conversion. Development of mobile GIS-based asset condition inspection methods and tools.
International and national expert inputs for development of asset management system and engineer link to unified damage and loss database. Input from MSS to the development in introduction of guidelines.

International and national expert inputs for development of asset management system and engineer link to unified damage and loss database.

Input from MSS to the development in introduction of guidelines.

### 1.2.3 Develop and implement an infrastructure asset management system linked to Damage and loss database.

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop and implement an infrastructure asset management system linked to</td>
<td>Procurement of asset management system. Collection of asset register</td>
</tr>
<tr>
<td>Damage and loss database. Introduce asset inspection guidelines, methods and</td>
<td>datasets, validation, data cleansing, conversion. Development of mobile</td>
</tr>
<tr>
<td>approaches</td>
<td>GIS-based asset condition inspection methods and tools.</td>
</tr>
<tr>
<td>1.2.4 Develop and deliver a training programme in damage and loss and asset</td>
<td>International and national expert inputs for development of asset</td>
</tr>
<tr>
<td>management methods and tools to MSS staff</td>
<td>management system and engineer link to unified damage and loss database.</td>
</tr>
<tr>
<td></td>
<td>Input from MSS to the development in introduction of guideline.</td>
</tr>
<tr>
<td></td>
<td>Training (D&amp;L, asset management system)</td>
</tr>
</tbody>
</table>

Training of MSS, MSA and municipality staff in asset condition inspection. International expert inputs to train MSS staff on asset management system and damage and loss database.

### 1.3 Refine ordinances, regulations and associated codes and standards to
enable climate proofing small-scale rural infrastructure

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>This activity includes developing enabling conditions to create an</td>
<td>Consultants, Contractors, Training, Workshops and conferences</td>
</tr>
<tr>
<td>enforceable policy framework for climate resilient small-scale infrastructure</td>
<td></td>
</tr>
<tr>
<td>development. This will be delivered by implementing the following:</td>
<td>International and national experts. Extensive stakeholder consultations</td>
</tr>
<tr>
<td>1.3.1 Develop Gender Responsive Climate Change Strategy and Action Plan which</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Development of a climate change strategy for gender in the context of</td>
</tr>
<tr>
<td></td>
<td>prioritization of small scale infrastructure development.</td>
</tr>
<tr>
<td>Result Area</td>
<td>Activity</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1.3.2 Review and revise all standards, guidelines and specifications for rural infrastructure, encompassing both technical and functional standards to respond to climate risk reduction requirements, based on international best practices.</td>
<td>Review and revise standards, guidelines for rural infrastructure</td>
</tr>
<tr>
<td>1.3.3 Input to the development of the Rural Roads Master Plan &amp; Investment Strategy 2016–2020 to help embed climate resilience measures into road master planning.</td>
<td>International and national experts. Roads Department (4RD) staff</td>
</tr>
<tr>
<td>1.3.4 Input to the development of a National Water Supply Policy and Strategic Plan to provide the medium to long-term vision for the sector and to provide a framework for the institutional arrangements, overall operation and management of DNSA and coordination with other sectoral agencies and partners, to ensure that climate resilience approaches are embedded in the policy and strategy for water supply</td>
<td>International and national experts. MPWTC staff</td>
</tr>
<tr>
<td>1.3.5 Develop guidelines and SOPs for all infrastructure investments to be carried out under the municipal (PDIM) and village (PNDS) development plans to make these plans climate responsive</td>
<td>International and national experts. MPWTC, training of municipality staff</td>
</tr>
<tr>
<td>1.3.6 Develop a capacity building plan and roadmap for national and regional authorities to integrate new policies, plans and strategies and guidelines into PDIM and PNDS. This would include the development of tools that will be needed for implementation and enforcement of new methods and guidelines for CR infrastructure development planning and implementation</td>
<td>International and national experts.</td>
</tr>
<tr>
<td></td>
<td>International and national experts.</td>
</tr>
<tr>
<td>1.3.7 Implement capacity building and training based on CDP for national and regional authorities</td>
<td></td>
</tr>
<tr>
<td>---</td>
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</tr>
<tr>
<td>1.3.8 Support the National Institute for Public Administration (INAP) to implement Disaster Risk Management Training Manual, which has recently been launched by Ministry of Social Solidarity and INAP.</td>
<td>Training</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.1 Climate risk reduction measures for small-scale rural infrastructure are fully integrated into the planning and budgeting cycles of Village and Municipal development plans</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>This activity includes the Introduction of climate risk screening methods and embed climate risk reduction criteria across PDIM and PNDS planning and decision-making cycle. Under this activity the project will provide step-by-step guidelines for climate risk reduction measures for all categories of small-scale rural infrastructure through PDIM manual – CAMP; Community-based management and maintenance – GMF manual, KAM – municipal procurement guidelines and administrative post and the Ministerial Technical Committee review checklists. The following will be implemented:</td>
<td>Consultants, Contractors, Training, Workshops and conferences, materials and goods</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.1.1 Develop step-by-step guidelines for climate risk reduction measures for all categories of small-scale rural infrastructure (water supply, road and bridges, irrigation, flood defences) through PDIM manual – CAMP; Community-based management and maintenance – GMF manual, KAM – municipal procurement guidelines and administrative post and the Ministerial Technical Committee review checklists</th>
<th>Consultants to provide TA for development of step-by-step guidelines for climate risk reduction measures for all categories of small-scale rural infrastructure through PDIM</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1.2 Train team of technical staff of Equipment Verification, Evaluation and Supervision (EVAS) to determine the likelihood and consequences of risk in relation to asset (infrastructure exposure and vulnerability). Their skills to engineer climate resilient designs and apply various methods of bioengineering (e.g. by use of local vetiver plants to stabilize the slopes and gabion structures) will be developed</td>
<td>Training, Workshops and conferences</td>
</tr>
<tr>
<td>2.1.3 Provide technical assistance to Administrative Post (AP) staff in prioritizing projects at this level and in undertaking an appropriate level of feasibility studies on which to base climate-risk informed project prioritization.</td>
<td>Training and technical assistance to AP staff in climate resilient project prioritisation and feasibility studies</td>
</tr>
<tr>
<td>2.1.4</td>
<td>At municipal level, introduce climate risk criteria into the prioritization process, and include other methods of measuring benefits of projects based on the introduction of appraisal-led project prioritisation using socio-economic cost-benefit analysis methods and tools to be developed under Activity 1.1. Undertake detailed CBA for 130 prioritised infrastructures projects in 6 target municipalities. Provide capacity development to enhance the ability to undertake engineering feasibility studies and incorporate climate-risk considerations into technical feasibility.</td>
</tr>
<tr>
<td>---</td>
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</tr>
<tr>
<td>2.1.5</td>
<td>Introduce investment feasibility considerations, socio-economic cost-benefit analysis, optioneering and options appraisal methods as well as environmental impact assessment that integrate climate change impact scenarios, to strengthen the feasibility process, safeguard investments and optimize engineering solution. Develop long-term municipality investment plans for PDIM and PNDS.</td>
</tr>
<tr>
<td>2.1.6</td>
<td>At the detailed design level, technical assistance will be provided to introduce climate change considerations into design of infrastructure to ensure that they will accommodate likely changes of environmental variables (frequency and intensity of occurrence) expected with climate change. Environmental impact assessment (EIA) will be introduced at the detailed design stage, in line with international good practice.</td>
</tr>
<tr>
<td>2.1.7</td>
<td>Train municipality engineers in the new climate-risk informed infrastructure detailed design methods and include specific training in the design of bio-engineering methods relevant to Timor Leste. Bioengineering training will be done through technical assistance and by providing dedicated trainings on bio-engineering.</td>
</tr>
<tr>
<td>2.1.8</td>
<td>Introduce processes for pre-qualifying contractors, based on specific criteria such as certification in prior trainings on implementation of climate-resilient projects, experience of implementing climate-resilient projects, experience of contract management of such climate-resilient projects and access to engineering expertise aligned with the types of climate resilient measures to be built.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Training and technical assistance to municipality staff</th>
<th>TA and municipal engineering input using new CBA methods for project prioritization.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detailed CBA of 130 infrastructure projects</td>
<td></td>
</tr>
<tr>
<td>Training and technical assistance to municipality staff</td>
<td>International and local experts</td>
</tr>
<tr>
<td>Training and technical assistance to municipality staff</td>
<td>International and local experts</td>
</tr>
<tr>
<td>Training and technical assistance to municipality staff</td>
<td>Training</td>
</tr>
<tr>
<td>Training and technical assistance to municipality staff</td>
<td>Development of pre-qualification criteria, training of contractors in CR methods</td>
</tr>
</tbody>
</table>
### 2.2 Implementation of climate-proofing measures for small-scale rural infrastructure

This activity will carry out the investment component as part of the decentralized investment programmes of PDIM and NPDS and will embed climate resilient practice. Small-scale rural infrastructure in the target districts and villages will be climate proofed.

#### 2.2.1 Detailed design and construction of 130 CR infrastructure projects

- Detailed design, procurement and implementation of 130 infrastructure including TA of international and national experts, community engagement, preparation of bill of quantities development, input to procurement process, construction supervision, construction hand over.
- Safeguards expert (international consultant) for implementation of the ESMF
- Procurement and implementation/contract for infrastructure units (multiple contracts)
- Procurement of services for O&M for years 3-6 of project implementation (multiple contracts)
- Purchase of six motorbikes and 4 vehicles in support to project implementation, 2 DSLR camera and other related communication equipment
- International and national consultants
- National experts for oversight and supervision - (2 engineers @ $114096) = $228,192

### 2.3 Supporting catchment management and rehabilitation measures to enhance climate resilient infrastructure and communities

This activity includes scaling-up climate resilient catchment management in order to reduce the exposure of communities and their physical assets, such as rural infrastructure, to climate-induced hazards. The following will be implemented:

- Consultants, Contractors, Training, Workshops and conferences, materials and goods
- Technical Assistance to MAF

### Engineering inputs to detailed design, procurement and implementation of 130 infrastructure schemes (TA, municipal input, international experts, community engagement, bill of quantities development, procurement process, construction supervision, construction hand over)
<table>
<thead>
<tr>
<th>2.3.1 Develop agroforestry and reforestation strategy for infrastructure sub-catchments</th>
<th>2.3.2 Implement agroforestry and reforestation strategy for infrastructure sub-catchments</th>
</tr>
</thead>
</table>
| Local Labour for land preparation, planting etc.  
Maintenance of agroforestry plantations  
Purchase of seedlings | Seedling Production, Land Preparation and Out-Planting, Monitoring and Reporting, Farmer Registration, Farm Registration, Product Registration (if the farmers decide to go purely organic), Tree Registration and Certification |
H.2. Arrangements for Monitoring, Reporting and Evaluation

294. Project-level monitoring and evaluation will be undertaken in compliance with the UNDP POPP and the UNDP Evaluation Policy.

Oversight and monitoring responsibilities:

295. The primary responsibility for day-to-day project monitoring and implementation rests with the National Project Manager. The Project Manager will develop annual work plans to ensure the efficient implementation of the project. The Project Manager will inform the Project Board and the UNDP Country Office of any delays or difficulties during implementation, including the implementation of the Monitoring & Evaluation (M&E) plan, so that the appropriate support and corrective measures can be adopted. The Project Manager will also ensure that all project staff maintain a high level of transparency, responsibility and accountability in monitoring and reporting project results.

296. The UNDP Country Office will support the Project Manager as needed, including through annual supervision missions. The UNDP Country Office is responsible for complying with UNDP project-level M&E requirements as outlined in the UNDP POPP. Additional M&E, implementation quality assurance, and troubleshooting support will be provided by the UNDP Regional Technical Advisor. The project target groups and stakeholders including the NDA Focal Point will be involved as much as possible in project-level M&E.

297. A project inception workshop will be held after the UNDP project document is signed by all relevant parties to: a) re-orient project stakeholders to the project strategy and discuss any changes in the overall context that influence project implementation; b) discuss the roles and responsibilities of the project team, including reporting and communication lines and conflict resolution mechanisms; c) review the results framework, re-assess baselines as needed, and discuss reporting, monitoring and evaluation roles and responsibilities and finalize the M&E plan; d) review financial reporting procedures and mandatory requirements, and agree on the arrangements for the annual audit; e) plan and schedule Project Board meetings and finalize the first year annual work plan. The Project Manager with support of CTA will prepare the inception report no later than one month after the inception workshop. The final inception report will be cleared by the UNDP Country Office and the UNDP Regional Technical Adviser, and will be approved by the Project Board.

298. An Annual Project Report (APR) will be prepared for each year of project implementation. The Project Coordinator, the UNDP Country Office, all project RPs and the UNDP Regional Technical Advisor will provide objective input to the APR. The Project Coordinator guided by CTA will ensure that the indicators included in the project results framework are monitored annually well in advance of the APR submission deadline and will objectively report progress. The annual report will be shared with the Project Board and other stakeholders. The UNDP Country Office will coordinate the input of the NDA Focal Point and other stakeholders to the Report. Within three months after the third year of the project interim independent evaluation will be conducted. The final project report, along with the terminal evaluation report and corresponding management response, will serve as the final project report package. Semi-annual reporting will be undertaken in accordance with UNDP guidelines for quarterly reports that are produced by the project Manager.

299. An independent mid-term review process will be undertaken and the findings and responses outlined in the management response will be incorporated as recommendations for enhanced implementation during the final half of the project’s duration. The terms of reference, the review process and the final MTR report will follow the standard templates and guidance available on the UNDP Evaluation Resource Center. The final MTR report will be cleared by the UNDP Country Office and the UNDP Regional Technical Adviser, and will be approved by the Project Board. The final MTR report will be available in English.

Additional GCF evaluation requirements:

300. An independent terminal evaluation (TE) will take place no later than three months prior to operational closure of the project. The terms of reference, the review process and the final TE report will follow the standard templates and
guidance available on the UNDP Evaluation Resource Center. The final TE report will be cleared by the UNDP Country Office and the UNDP Regional Technical Adviser, and will be approved by the Project Board. The TE report will be available in English. The UNDP Country Office will include the planned project terminal evaluation in the UNDP Country Office evaluation plan, and will upload the final terminal evaluation report in English and the management response to the public UNDP Evaluation Resource Centre (ERC) (erc.undp.org). The MTR and TE will be carried out by an independent evaluator. The evaluation report prepared by the independent evaluator is then quality assessed and rated by the UNDP Independent Evaluation Office.

301. The UNDP Country Office will retain all M&E records for this project for up to seven years after project financial closure in order to support ex-post evaluations. A detailed M&E budget, monitoring plan and evaluation plan will be included in the UNDP project document.

Project Impact Monitoring and Evaluation:

302. To examine the impacts of the project on rural communities, the review will examine whether the interventions implemented by the project have enhanced the value and derived benefits from existing community assets such as land, water, and livelihoods. Impact on income generation and improvement in livelihoods will be key direct benefits to be examined. Impact on increased capacity of local communities to exploit potential economic opportunities and to develop stronger link with the markets and external partners, through the risk reduction and adaptation interventions provided by the project, will be examined. Efforts to strengthen local institutions and construction and engineering companies in the implementation of similar projects in the future will be a key impact as this will reflect whether the project has built local capacity to implement and use these new climate proofing measures in the long-term. Likely contribution of the project to food security will be examined. Since the project is introducing agro-forestry as a means of safeguarding livelihoods, it will be important to directly monitor the extent to which is being achieved.

303. Environmental degradation very often contributes to vulnerability to climate change and increased risk from climate-related disasters. The extent to which the project contributes to the rehabilitation of the environment (particularly of the agricultural resource base and watershed management) in areas currently affected by land degradation and at high risk of hazards, is strongly associated with poverty impact. This domain concentrates on the local level environmental impacts of the project, as well as any environmental consequences of the project. It is also concerned especially with those environmental aspects, which are under the control of, or are influenced by, the rural communities. Environmental impacts may be negative as well as positive, intended or unintended, and all of these will be examined. The agroforestry intervention’s prime goal is to use this approach as a sustainable mitigating measure to protect infrastructure from climate change-related hazards such as erosion and landslide. To directly measure if this goal was achieved, the improvement of the ground surface ecosystem of the water catchment will be observed. Counting the number of trees that survive and measuring the lines of hedgerows established is possible; however, to observe overall physical changes an aerial survey is more appropriate. To do this, the project will make use of UAVs. The comparison of physical ground improvements due to the agroforestry intervention will be done using before and after aerial images. To measure if the agroforestry intervention is successful in minimizing soil-erosion, sediment-traps will be laid-out in strategic locations. The Municipal Suco Extension Workers (MSEW) and the agro-foresters (AFs) will visit the traps and record their observation after each major rain event. AFs will also undergo a training course on basic farm record keeping and the MSEW will ensure that AFs are using this tool. The farm records will include all related cost and return figures. The consolidated information gathered from farm records will then be useful during the project-end year economic valuation.

304. Existing institutions, policies and regulatory frameworks significantly influence the lives and resilience of the rural poor. This encompasses the change brought about in sectoral and national policies affecting exposure of local communities to hydro-meteorological hazards. In addition, the degree to which the project impacts local-level decision making capacity is also a relevant consideration and important to this project. The review will examine the extent to which a contribution has been made to improving the national, and particularly local, institutions to implement climate resilient infrastructure that affects the lives and livelihoods of rural communities.
To monitor and measure the changes brought by the project, impact evaluation will be designed to assist the project team to collect baseline information/data, final survey to gain insights into developmental and adaptive impact of the interventions that will be carried out during the project. For this purpose, before any interventions take place, a robust baseline survey needs to be administered. During the project, it is expected follow-up surveys and final large survey will also be carried out at end of project. The impact of the project will be assessed by undertaking the following:

- A household survey targeting beneficiary households at least two times (baseline and final) during the project implementation;
- Analysis of the survey data;
- Follow-up survey which will be used by project staff; and
- Training of project staff on the follow-up survey methodology.

The methodologies for monitoring and reporting for the project outcomes are outlined in the means of verification in Table H.1.2 through which progress on each indicator from the baseline to the mid-point and end-point targets will be tracked.

More specifically, the results of Output 1 will be monitored through the administration of qualitative scorecards to measure awareness and adaptive capacity. A series of target surveys will reveal the level of knowledge and skills acquired through specialized trainings and TOTs. Desk reviews will be applied to identify whether the PDIM, NPDS and other relevant investment frameworks and policies have embedded the multi-hazard risk information delivered by the project. Stakeholder surveys will also be used to verify systematic production and use of quality risk information in relation to the design and deployment of small-scale rural infrastructure.

For Output 2, detailed HH surveys will be undertaken to monitor physical stability of the infrastructure units and the quality of their services, as delivered by the project through the implementation of climate proofing measures. The surveys will capture changes in household and livelihood conditions for target beneficiaries, especially women, and the implications of improved access to water on their wellbeing and livelihoods. Additionally, HH questionnaires will be designed to elicit information, among other aspects, on access, ease of use, quality of service, functioning of the community structures, quality of support from the institutional staff, and issues around O&M of the infrastructure units. The tailored surveys will be conducted in relation to all categories of infrastructure units, the benefits of their functional longevity and durability, and the overall impact on adaptive capacity of target municipalities. The questionnaires will also capture the benefits of agro-forestry on household incomes and adaptive capacity. These questionnaires will be combined with regular field monitoring, verification and spot-checks. The field surveys will monitor tending measures and survival rates of planted trees as well as changes in erosion rates in the target sub-watersheds. The field reports will capture the progress on delivery and the application of all safeguards measures.

The impact indicators will include but should not be limited to: (i) extent to which the project interventions such as improved DRM capacities and improved access to and use of climate risk information, have reduced exposure to hazards (ii) changes in income from agriculture and related activities (changes in income should take into account the level of home consumption); (iii) yield from agricultural production for key produce; (iv) yield of home gardens; (y) migration for seasonal work; (vi) farm land left fallowed; (viii) freshwater availability for household use; (viii) change in family savings.

As part of the community survey a section will be included to monitor community involvement in the design and implementation of community-based agro-forestry schemes – tracking participation in paid work opportunities, as well as ongoing involvement in resilience building through in-kind commitment of time to maintenance and enforcement activities e.g. the community-based agro-forestry to be implemented on state land. This will include respondents’ estimation of approximate number of hours per month spent on local resilience building actions. Finally, monitoring over the implementation and results of site specific structural protection measures at 130 sites will be ensured as outlined in the ESMF.
311. Since the project impacts from many of the interventions are likely to be realized close to the culmination of, and even after, project implementation, the impact evaluation methodology and tools will be embedded within responsible agencies to monitor in the long-term. This will ensure regular surveying of the key impact and development indicators required for long-term assessment of project results. Project monitoring and evaluation will be undertaken in compliance with the UNDP POPP, the UNDP Evaluation Policy.
## 1. Supporting Documents for Funding Proposal

- NDA No-objection Letter (Annex I)
- Feasibility Study (Annex II)
- Financial Analysis (Annex III (a))
- Financial Analysis (excel) (Annex III (b))
- Co-financing Letters (Annex IV (a))
- O&M Letter (Annex IV (b))
- Term Sheet (Annex V)
- Social and Environmental Screening Procedure (SESP) (Annex VI (a))
- Environmental and Social Management Framework (ESMF) (Annex VI (b))
- Appraisal Report or Due Diligence Report with recommendations (If applicable) (Annex VII)
- Evaluation Report of the baseline project (If applicable) (Annex VIII)
- Map indicating the location of the project/programme (Annex IX)
- Timetable of project/programme implementation (Annex X)

### Additional information

- Programme/Project Confirmation (Annex XI)
- Economic Analysis (Annex XII (a))
- Cost-benefit Analysis (excel) (Annex XII (b))
- Procurement Plan (Annex XIII (a))
- Operations and Maintenance Plan (Annex XIII (b))
- Gender Assessment and Action Plan (Annex XIII (c))
- Stakeholder Consultations (Annex XIII (d-1))
- Stakeholder Engagement Plan (Annex XIII (d-2))
- UNDP Micro-Assessments (Annex XIII (e))
- Detailed Budget and Workplan (Annex XIII (f))
- AE Fee request (Annex XIII (g))
- IRR Worksheet – Project Ranking (Annex XIII (h-1))
- IRR Worksheet – Flood Control (Annex XIII (h-2))
- IRR Worksheet – Irrigation (Annex XIII (h-3))
- IRR Worksheet – Rural Roads (Annex XIII (h-4))
- IRR Worksheet – Water Supply (Annex XIII (h-5))
- Responses to GCF comments on Funding Proposal (Annex XIV)
- UNDP Letter of endorsement (Annex XV)
☐ Responses to iTAP comments

* Please note that a funding proposal will be considered complete only upon receipt of all the applicable supporting documents.
To: The Secretariat Green Climate Fund (GCF) Secretariat

Ref. No: 86 /DNAC /IV/2017

Subject: Letter of No Objection to the Safeguarding communities and their physical and economic assets from climate change induced disasters in Timor-Leste

Dili, 07 April, 2017

Dear Madam, Sir,

We refer to the project “Safeguarding communities and their physical and economic assets from climate change induced disasters in Timor-Leste” as included in the Concept Note shared by United Nations Development Programme (UNDP) with the government of Timor-Leste in March 2017.

The undersigned is the duly authorized representative of Ministry of Commerce, Industry and Environment and the GCF focal point of Democratic Republic of Timor-Leste.

Pursuant to GCF decision B.08/10, the content of which we acknowledge to have reviewed, we hereby communicate our no-objection to the project as included in the funding proposal.

By communicating our no-objection, it is implied that:

(a) The government of Timor-Leste has no-objection to the project as included in the funding proposal;
(b) The project as included in the funding proposal is in conformity with Timor-Leste’s national priorities, strategies and plans;
(c) In accordance with the GCF’s environmental and social safeguards, the project as included in the funding proposal is in conformity with relevant national laws and regulations.

We also confirm that our national process for ascertaining no-objection to the project as included in the funding proposal has been duly followed.

We acknowledge that this letter will be made publicly available on the GCF website.

Kind regards,

Augusto Manuel Pinto
GCF National Focal Point
Director, National Directorate for Climate Change,
Ministry of Commerce, Industry and Environment, Timor-Leste
Environmental and social safeguards report form pursuant to para. 17 of the IDP

<table>
<thead>
<tr>
<th>Basic project or programme information</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project or programme title</strong></td>
<td>Safeguarding rural communities and their physical assets from climate induced disasters in Timor Leste</td>
</tr>
<tr>
<td><strong>Existence of subproject(s) to be identified after GCF Board approval</strong></td>
<td>No</td>
</tr>
<tr>
<td><strong>Sector (public or private)</strong></td>
<td>Public</td>
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<tr>
<td><strong>Accredited entity</strong></td>
<td>United Nations Development Programme (UNDP)</td>
</tr>
<tr>
<td><strong>Environmental and social safeguards (ESS) category</strong></td>
<td>Category B</td>
</tr>
<tr>
<td><strong>Location – specific location(s) of project or target country or location(s) of programme</strong></td>
<td>Timor Leste</td>
</tr>
</tbody>
</table>

**Environmental and Social Impact Assessment (ESIA) (if applicable)**

<p>| Date of disclosure on accredited entity's website | Monday, January 21, 2019 |
| Language(s) of disclosure | English and Tetum |
| Explanation on language | Tetum is an official language in Timor Leste and spoken by the beneficiary communities |
| <strong>Link to disclosure</strong> |  |
| <strong>Other link(s)</strong> |  |</p>
<table>
<thead>
<tr>
<th>Remarks</th>
<th>An ESIA consistent with the requirements for a Category B project is contained in the Environmental and Social Management Framework (ESMF)</th>
</tr>
</thead>
</table>

### Environmental and Social Management Plan (ESMP) (if applicable)

| Date of disclosure on accredited entity's website | Monday, January 21, 2019 |
| Language(s) of disclosure | English and Tetum |
| Explanation on language | Tetum is an official language in Timor Leste and spoken by the beneficiary communities |

**Link to disclosure**

- **English**: [https://www.undp.org/content/dam/timorleste/docs/Publication/FP-UNDP-171218-5910-Annex%20VI%20_b_.pdf](https://www.undp.org/content/dam/timorleste/docs/Publication/FP-UNDP-171218-5910-Annex%20VI%20_b_.pdf)

### Environmental and Social Management System (ESMS) (if applicable)

| Date of disclosure on accredited entity's website | N/A |
| Language(s) of disclosure | N/A |
| Explanation on language | N/A |
| Link to disclosure | N/A |
| Other link(s) | N/A |

**Remarks**

An ESMP consistent with the requirements for a Category B project is contained in the Environmental and Social Management Framework (ESMF)

**Any other relevant ESS reports, e.g. Resettlement Action Plan (RAP), Resettlement Policy Framework (RPF), Indigenous Peoples Plan (IPP), IPP Framework (if applicable)**
| Description of report/disclosure on accredited entity's website | Monday, January 21, 2019 |
| Language(s) of disclosure | English and Tetum |
| Explanation on language | Tetum is an official language in Timor Leste and spoken by the beneficiary communities |
| Other link(s) | NDA Website  
| Remarks | Annex VI (a) – Social and Environmental Screening Template |

**Disclosure in locations convenient to affected peoples (stakeholders)**

| Date | Tuesday, January 1, 2019 |
| Place | UNDP, Ministry of State Administration and Municipality Administration Offices (Lautem, Viqueque, Baucau, Aileu, Ermera, Liquiça) |

**Date of Board meeting in which the FP is intended to be considered**

| Date of accredited entity's Board meeting | Not applicable |
| Date of GCF's Board meeting | Saturday, July 6, 2019 |

Note: This form was prepared by the accredited entity stated above.
Secretariat’s assessment of FP109

Proposal name: Safeguarding rural communities and their physical and economic assets from climate induced disasters in Timor-Leste

Accredited entity: United Nations Development Programme (UNDP)

Country/(ies): Timor-Leste

Project/programme size: Medium

I. Overall assessment of the Secretariat

1. The funding proposal is presented to the Board for consideration with the following remarks:

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Points of caution</th>
</tr>
</thead>
<tbody>
<tr>
<td>The project is in a Small Island Developing State and Least Developed Country and has a strong climate rationale and theory of change</td>
<td>Good technical oversight through partnership with key agencies will be required for successful implementation</td>
</tr>
<tr>
<td>Most of the budget is aimed at direct on-the-ground interventions, including enhancing the resilience of small-scale infrastructure and catchment management</td>
<td>Management of the multi-stakeholder process will require proper attention</td>
</tr>
<tr>
<td>The comprehensive approach links climate information to planning and investment/budgeting processes. It utilizes innovative eco-disaster risk reduction/climate risk management solutions that integrate multi-hazard early warning system approaches and are based on robust assessment and evidence</td>
<td>Water supply interventions should be accompanied by improved sanitation and hygiene, which is to be provided in parallel by a number of partners coordinated by the Government of Timor-Leste</td>
</tr>
<tr>
<td>The proposal includes significant investment in capacity development in the target areas</td>
<td>Currently there is a local technical capacity deficit in some core areas of the proposed interventions</td>
</tr>
<tr>
<td>For a least developed country and small island developing State, the proposal features a high level of co-financing from different government ministries (over 1.5 times the GCF grant contribution)</td>
<td></td>
</tr>
<tr>
<td>The proposal includes extensive community involvement that will help create ownership, efficiency and commitment</td>
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</tbody>
</table>

2. The Board may wish to consider approving this funding proposal with the terms and conditions listed in the respective term sheet and addendum XIII titled “List of proposed conditions and recommendations”.

II. Summary of the Secretariat’s assessment

2.1 Project background and climate rationale

3. Timor-Leste is a small island developing State that is highly vulnerable to the impacts of climate variability and change and is currently experiencing increasing frequency and intensity of extreme weather and related disasters. It has fragile socioeconomic and ecological systems, which combine with extreme weather events to cause severe damage to infrastructure, including small-scale rural infrastructure like water supply and drainage systems, embankments, roads and bridges.

4. The proposal has undertaken a comprehensive assessment (feasibility study) on the areas of intervention and demonstrated robust results that are aligned with the GCF investment criteria and articulated in the project design.

5. The main multi-hazards of landslides, floods, erosion and drought cause on average yearly economic losses of USD 203 million, USD 37 million, USD 10 million and USD 12.5 million, respectively. As climate change gathers pace, mid-century projections of these losses are expected to increase by 26 per cent, 21 per cent, 55 per cent and 58 per cent, respectively, and account for about 11.5 per cent of the gross domestic product. Rural communities are disproportionately affected, with damaged roads and related infrastructure leading to disruptions in their daily lives, isolation, and lack of basic services. The situation is further complicated by gaps in technical capacity and knowledge of climate change and vulnerability, which have become major barriers to adequately integrating adaptation and risk management considerations into the broader development planning processes, particularly those relating to infrastructure, social protection, land planning and budgeting.

6. The project aims to improve the resilience of rural communities by addressing the underlying causes of vulnerability of social and physical rural infrastructure. These vulnerabilities are characterized by limited capacity to generate and use information on climate risks and vulnerability for early warning and action, as well as inadequate response capabilities and financing to safeguard physical assets. The proposal articulates a theory of change that is grounded in robust climate rationale and thus provides a strong case for GCF intervention.

7. This project will directly benefit 175,840 people from rural communities, who will gain access to better climate risk information for dynamic decision-making and response, and build climate-resilient infrastructure, such as water supply and irrigation systems, roads, bridges and flood defences. A total of 130 small, on-the-ground interventions are planned, which will be designed and implemented with financing from GCF and the Government of Timor-Leste with the active participation of the rural communities. Communities will benefit from the improved land use and land management in 1,500 hectares (ha) through a combination of agroforestry, reforestation and catchment management measures, contributing to the protection of a wide catchment area and local communities from landslide, drought and flood episodes.

8. In addition to direct on-the-ground interventions, infrastructure will be made more resilient by mainstreaming/embedding climate resilience standards into the broader development planning processes, starting with how small-scale rural infrastructure is designed, constructed and maintained. The technical capacity to be established by the project for generating and analysing climate risk and early warning information (activity 1.1) is expected to contribute effectively to better policy and decision-making through the integration of climate risk reduction measures in the planning and budgeting cycles at the village and municipal levels (activity 2.1) and the creation of a knowledge database for managing climate-induced disasters (activity 1.2).
Project financing

9. The proposal provides a good financial proposal for an adaptation project from a least developed country and small island developing State with significant socioeconomic development challenges. The United Nations Development Programme (UNDP) has requested a USD 22.95 million grant from GCF, which will be supplemented by a USD 36.69 million co-financing contribution from the Government of Timor-Leste (to be obtained from budgets of a number of ministries) and a USD 0.4 million contribution from UNDP to cover project management costs. The Government of Timor-Leste will contribute: (1) USD 7.187 million (annually over five years) for operation and maintenance (O&M) costs for the 130 resilient infrastructure units; (2) USD 12.5 million from the Ministry of State Administration (MSA) for climate-proofing small-scale infrastructure; (3) USD 12.0 million (over five years) through the Ministry of Agriculture and Fisheries (MAF) for agroforestry and reforestation of approximately 137 ha in the six target municipalities; (4) USD 5 million through the Ministry of Social Solidarity (MSS) for disaster risk management activities in the six municipalities; and (5) USD 0.4 million as UNDP co-financing for project management costs.

10. GCF funding will cover activities 1.1, 1.3 and 2.1, which are associated with capacity-building for climate information and early warning services, risk management, adaptation planning and the revision of national building codes. The cost of on-the-ground interventions (activities 2.2 and 2.3, which together account for over 80 per cent of the project cost) will be jointly covered by GCF and co-financing at a ratio of nearly 1:2. The budget includes infrastructure maintenance costs during the lifetime of the project, which will be covered by co-financing from the Government of Timor-Leste. In addition, the accredited entity (AE) is in the process of securing a commitment letter that extends O&M coverage by the Government to 20 years.

2.2 Component-by-component analysis

Component 1: Climate risk information generation and integration into planning and management (total cost: USD 7.72 million; GCF cost: USD 3.25 million, or 42 per cent)

11. Activities under output 1 seek to address gaps in the capacities of sectoral institutions to generate climate information and assess, track and respond to vulnerability, a fundamental step in integrating adaptation into wider decision-making processes throughout the administration.

12. Activity 1.1 will develop and deliver climate risk information services and vulnerability mapping that will provide the basis for informed decision-making. This will involve the introduction of socioeconomic risk models and cost-benefit analysis tools for adaptation solutions – which will incorporate existing data on infrastructure, land use, property and other economic data – as well as technical staff trainings in climate risk modelling, mapping and vulnerability assessments, cost-benefit analyses, and project appraisal with a focus on infrastructure planning for adaptation. Local field officers will be trained in surveying techniques to ensure adequate geographic information system mapping.

13. Activity 1.2, largely financed by the Government of Timor-Leste, will establish a database to monitor, record and take account of climate-induced damages. This addresses a key knowledge gap (in combination with activity 1.1) that will facilitate the understanding of climate risks and associated costs and result in better informed policy and dynamic decision-making. Activity 1.3 will refine ordinances, regulations and building code standards, which will enable the climate-proofing of small-scale infrastructure. This ensures climate considerations are mainstreamed in infrastructure resilience planning for new infrastructure development in the country. Specific interventions are described in good detail in the funding proposal.
Component 2: Climate risk reduction and climate-proofing measures for small-scale rural infrastructure (total cost: USD 50.13 million; GCF cost: USD 18.44 million, or 37 per cent)

14. This output focuses on building resilience at the municipal and village levels in six priority districts, with a combined population of 522,000, by:

(a) Building the capacity of local governments to incorporate adaptation measures into the regular planning and budgeting processes of the village and municipal development plans; and

(b) Directly undertaking on-the-ground infrastructure resilience and ecosystem-based adaptation interventions to reduce the vulnerability of people and communities.

15. Activity 2.1 seeks to mainstream adaptation considerations all the way down to the village and municipal level, where critical planning related to land use and small-scale infrastructure takes place. Capacity will be built in administrative posts to utilize information on climate hazards and risks generated in activity 1.1 to identify projects and enhance the ability to incorporate climate risk considerations into technical and financial feasibility studies, tools, such as socioeconomic cost-benefit analyses, optioneering, appraisal methods, and environmental impact assessments under climate change impact scenarios.

16. Activity 2.2, which at USD 33.8 million constitutes 55 per cent of the overall investment cost, includes 130 small-scale infrastructure resilience actions across four categories:

(a) Protection of rural water supply systems through land revegetation, formalization of informal sources of water, installation of standpipes, and other climate-resilient approaches;

(b) Rehabilitation of rural bridges and slope stabilization of rural road corridors with bio-engineering methods (e.g. vetiver grass for the protection of bridge openings and slope stabilization) and other sustainable structural measures;

(c) Installation of rural flood defences to withstand climate change impacts, with bioengineering methods where possible to prevent erosion; and

(d) Formalization of existing and new rural irrigation and storage systems to mitigate against intensified droughts that are projected to occur with climate change.

17. The four types of activities have a clear climate change rationale and a direct positive impact on the resilience of the local communities, individually and collectively. The economic analysis provided by UNDP appears to indicate that while some irrigation activities have a very high economic internal rate of return (EIRR) (115 per cent), others such as flood protection systems have a very small EIRR (2 per cent). It should be noted that the economic analysis of such small-scale infrastructure on an asset-by-asset basis is complicated, and that synergies and the key social and environmental benefits of the investments are not captured. As such, the Secretariat considers that the overall EIRR is more relevant in informing the merits of the intervention as a whole.

18. Activity 2.3 comprises catchment management and rehabilitation measures following an ecosystem-based adaptation approach, with communities actively participating in agroforestry. Restored catchment functions will help further safeguard infrastructure. The target areas, comprising a total of 1,500 ha (of which 20 per cent will have interventions financed by GCF) will be selected on the basis of the vulnerability maps developed. GCF funding will target agroforestry strategy development, the purchase of agricultural inputs, rehabilitation works, and O&M during the lifetime of the project. This activity, in addition to its potential to reduce vulnerability, also has relevant potential adaptation co-benefits in terms of generating economic
activity and improving the health of ecosystems, and possible mitigation co-benefits in terms of carbon sequestration.

III. Assessment of performance against investment criteria

3.1 Impact potential  
Scale: High

19. The project targets the most vulnerable districts of the country that have been identified based on poverty indices, infrastructure deficits, gaps in basic public services and social vulnerabilities, and high exposure to climate-induced disasters. It proposes building the resilience of physical assets to climate variability and change through direct on-the-ground interventions that target 130 infrastructure units (47 road slope stabilization projects with a combined length of 216.94 kilometres; 38 water supply systems; 25 irrigation systems with a combined length of 54.18 kilometres; and 20 flood defences along 14.15 kilometres of river, for a total value of USD 25.68 million. The resilience of ecosystems will also be improved: 300 ha of land will benefit from agroforestry and restoration activities (100 ha of reforested state lands, 100 ha of agroforestry on state lands, and 100 ha of agroforestry on private land), resulting in improved livelihoods for 23,412 households. A further 1,200 ha will be improved through reforestation and agroforestry with co-financing from MAF.

20. By making rural irrigation systems climate-resilient and developing new, robust systems (including water storage) to secure water for prolonged consecutive dry days/seasons, the project will help reduce impacts of the projected intensified droughts. The proposed improved efficiency and sustainability of the rural water supply for agriculture strengthen the resilience of local agricultural livelihoods and well-being. More predictable rice production is expected to result in an increase in yield of 5,550 million tonnes per year, as the impacts of the dry season/droughts will be mitigated by irrigation.

21. The collective impact of the interventions on the population will be significant in terms of lives, livelihoods and assets for the 175,840 direct beneficiaries of the on-the-ground activities in output 2 (15 per cent of the total population). The broader community in the six districts (a total of 522,000 people) will benefit from improved institutional capacity and informed decision-making. Broader benefits include overall avoided costs, job creation, and revenues from the effective use of climate information and early warning to manage risks to lives, livelihoods and assets of communities.

22. In order to realize the benefits from water supply interventions, they must be implemented with improved sanitation and hygiene systems in place. There are a number of partners implementing water and sanitation interventions in the country. UNDP has presented a plan by which the Government of Timor-Leste, through its relevant Directorate General, will coordinate interventions of the different partners, ensuring that they go hand-in-hand with the water supply investments from the GCF project.

3.2 Paradigm shift  
Scale: High

23. The proposal clearly articulates and responds to the broader capacity gaps that exist in Timor-Leste to enable it to manage the climate risks to its low-emission, climate-resilient development. These gaps include:

(a) Limited knowledge and information on climate risks, damages and vulnerability;
(b) Inadequate or incomplete policies, institutions and standards to safeguard infrastructure from climate-induced damages;

(c) Limited capacity at the local level to integrate adaptation into plans and budgets; and

(d) Limited technical capacity to engineer climate-proof infrastructure.

24. It proposes addressing them through an integrated and comprehensive ecosystem-based climate risk reduction approach to climate-resilient small-scale rural infrastructure development that improves the availability of critical rural services.

25. As a result of the project, climate change considerations will be embedded within the current infrastructure planning framework at the national and, most importantly, municipal and village levels, where planning and budgeting for critical small-scale infrastructure takes place. Simultaneously, climate risk management capacity at key technical agencies and at the local level will be strengthened. Thanks to this double-pronged approach, it is expected that local governments will be able to adequately identify climate risks, plan adaptation interventions, and access public financial resources to protect and maintain infrastructure in the face of climate change impacts.

26. The technical innovation proposed is envisaged to transform the policy and decision-making process through the development of a decision support system for climate risk-proofing rural infrastructure and through capacity-building for local engineers and communities in the design and application of ecosystem-based risk reduction interventions.

27. Innovative interventions on agroforestry are envisaged to create a positive paradigm shift through behavioural change. They will provide livelihood alternatives to existing farming practices that currently exacerbate the climate-induced stresses on land and related natural resources.

28. Establishing the envisaged systems and processes will require good oversight by the AE, as the critical national capacity for effective implementation is yet to be effectively established. Adequate oversight should ensure that the relevant local capacity needed to sustain the project beyond its life cycle is built during implementation.

3.3 Sustainable development potential  

Scale: High

29. Overall, the proposal demonstrates a good business case for securing community lives, livelihoods and assets, addresses some of the core elements of the Paris Agreement, and is well-aligned with the Sustainable Development Goals and Sendai Framework for Disaster Risk Reduction (2015–2030). Specific assessments are provided below.

3.3.1. Social benefits

30. Revegetating land around rural water supply systems will strengthen community access to a more climate-resilient water supply system. The proposed intervention will provide 10.3 million cubic metres per year of constant supply, resulting in reliable water supplies for areas that currently have no potable water or experience erratic access and are impacted by a number of drought-related climatic extremes. This would create benefits for local communities in terms of reduced water-related diseases and improved overall well-being and productivity of communities.

31. Road rehabilitation would result in an improvement in year-round motor vehicle access of road and bridge infrastructures, reducing estimated travel times by half and creating
opportunities such as 24-hour emergency services (fire, ambulance, security) that are currently lacking in certain areas.

3.3.2. Economic benefits

32. UNDP estimates that the economic losses from a single multi-hazard event (e.g. involving floods, landslides and/or erosion) could be up to USD 141 million in the six target municipalities, which would not be fully covered by existing budgetary allocations of USD 12.5 million over five years. This intervention is therefore critical for the communities, reducing asset vulnerability directly through the small-scale resilience interventions and indirectly through better planning and building codes.

33. Rehabilitation of rural bridges and slope stabilization of rural road corridors using ecosystem-based approaches will increase their availability year-round and reduce overall operational cost as the approach has been proven to be cost-effective, climate-resilient, environmentally friendly and last longer than most traditional approaches. More importantly, access to critical rural infrastructure will improve safety of life, productivity and sustainable livelihoods.

3.3.3. Environmental benefits

34. The proposed ecosystem-based rural flood defences approach has been proven to be resilient to the estimated increasing frequency and intensity of climate-induced floods and protect flood embankments from climate-induced erosion. This includes creating the incentives for local communities to rehabilitate degraded watersheds and pursue livelihood practices that ensure sustainable natural resources management (land, water and forests). It consolidates field-proven methods and practices and implements them at a scale that is essential for transforming small-scale rural infrastructure development in the target municipalities while providing a strong basis for national upscaling and replication.

3.4 Needs of the recipient

Scale: High

35. Timor-Leste is a small island developing State with a high level of vulnerability to climate change-related landslides, floods, erosion and droughts, as shown by the current and expected economic losses under climate change scenarios described in paragraph 3. Furthermore, Timor-Leste is also a least developed country with 49 per cent of the population living in poverty. It has a fragile socioeconomic and political situation, and food security is an issue for close to half of the population, due to poverty, vulnerable infrastructure and inadequate public services, as well as climate change impacts. Financial resources for adaptation are scarce, and as such, GCF intervention is critical to make the project viable and sustainable.

36. The proposal has undertaken extensive consultations at the national, municipal and community levels, and the specific needs of the multiple recipients were considered in the design. It clearly outlines the capacity gaps and barriers to effective climate risk management and the broader development challenges at all levels. The interventions are also designed to meet these specific needs.

37. However, the narrative could be further strengthened by exploring what benefits could be derived through considerations of demographic dividends in designing the activities so as to maximize impacts of the interventions in the communities.
3.5 Country ownership

38. The proposal articulates the strategic vision of the country’s climate change strategy, its nationally determined contribution and its broader disaster risk reduction strategy. It is clearly aligned with the Sustainable Development Goals (targets 1, 2, 3, 6, 12 and 13) as well as the Sendai Framework and hence demonstrates the effectiveness of the interventions in addressing in a comprehensive and integrated manner the broader low-emission, climate-resilient development challenges.

39. The proposal builds on the experience of a number of earlier projects in the country that have built capacity at the community and institutional level, most relevant of which is the "Strengthening the Resilience of Small-Scale Rural Infrastructure and Local Government Systems to Climate Risk" project, which worked with facility management groups for community-based O&M financing. Using and expanding upon this capacity is critical for the implementation of a complex project in often remote settings that rely on the participation of communities in the implementation of activities and the maintenance of infrastructure. This will ensure buy-in at all levels, particularly at the community level where the project will be implemented and owned.

40. An extensive stakeholder consultation process, with specific attention to gender needs/priorities, was an integral part of the project design, informing aspects ranging from the prioritization of asset resilience interventions to the design of water irrigation and agroforestry schemes.

3.6 Efficiency and effectiveness

41. GCF is requested to provide a grant of USD 22.953 million to finance a project with a total cost of USD 60.04 million. The proposal features a significant contribution from national and local government institutions and ministries, amounting to USD 36.687 million (of which USD 7.187 million is O&M costs over the project life cycle), and a USD 0.4 million contribution from UNDP in the form of project management costs, for total co-financing of USD 1.60 for each USD 1.00 from GCF. GCF financing will cover 100 per cent of the costs of capacity-building activities 1.1, 1.3 and 2.1. The costs for on-the-ground activities 2.2 and 2.3 will be split, with GCF financing 42 per cent and 21 per cent of these, respectively. The proposed GCF amount was reduced from the original USD 35.453 million request by splitting the cost of on-the-ground interventions between GCF and MSA.

42. Most of the investments funded through the project will provide public goods, such as climate information services and flood protection, which clearly justify grant funding. For public infrastructure, such as rural roads, water supply and irrigation, grant funding is justified because many of the economic benefits accrue to users over the long term through avoided losses and expenditures due to climate-related disruptions. Although the UNDP financial analysis shows the project to be financially viable if GCF funding were replaced by commercial loans, it is not clear whether these loans would materialize without robust oversight, given the nature of the project. In addition, the Public Debt Law of Timor-Leste only allows concessional loans to be considered for the purpose of financing strategic infrastructure projects.

43. The proposed financial structure is considered adequate, and the inclusion of a well-articulated O&M budget and strategy – with long-term commitment from government and communities to sustain the infrastructure (reflected in budgets, policies and legislation) – helps guarantee the sustainability of the project in the long term.
44. The proposed ecosystems-based approaches are envisaged to have low maintenance costs compared to traditional approaches and could lead to significant savings in seven to nine years. Overall, the project demonstrates cost effectiveness, with an EIRR of 16.2 per cent over 25 years. The sensitivity analysis shows that the EIRR remains above the UNDP 10 per cent hurdle rate even in a case where costs are 15 per cent higher and benefits 15 per cent lower. The project seeks to integrate this type of cost-benefit analysis into local investment and maintenance planning, which would also contribute to the project’s paradigm shift potential.

IV. Assessment of consistency with GCF safeguards and policies

4.1 Environmental and social safeguards

45. The project aims to improve the resilience of vulnerable communities and their physical assets against the impacts of climate change. It will support capacity-building of the mandated government agencies and finance the rehabilitation and/or climate-proofing enhancements of small-scale rural infrastructure in six priority municipalities, including water supply systems, rural roads and bridges, flood defences, irrigation systems, and catchment management activities such as reforestation and agroforestry. The project will be implemented by the Ministry of Commerce, Industry and Environment (MCIE).

46. The AE has assessed the environmental risk of the project to be moderate as the impacts are generally localized, limited in scale, and readily manageable through the application of standard mitigation measures. GCF agrees with this categorization and has assessed the same level of risks for the social safeguards, given that the interventions are not only small-scale but are also community-based. The project is thus given an overall category B risk rating.

47. The AE has provided to GCF a completed environmental and social screening form and an environmental and social management framework (ESMF). The ESMF provides that all subprojects will undergo the environmental licensing process under Timor-Leste’s Environmental Licensing Law, which includes an obligatory screening, commensurate impact assessment and government review. The ESMF has identified the potential impacts of the planned interventions and the corresponding generic control/mitigation measures. It also provided clear responsibilities for the units involved, including regular inspection/audit and reporting.

48. The project’s environmental and social impacts would come mainly from the construction/rehabilitation and catchment management activities. These include disturbance/loss of vegetation at worksites; erosion and sedimentation; contamination of water during construction; generation of noise, vibrations and dust; worker and public safety risks; clearing of native vegetation for agroforestry; possible spread of non-native weed species; possible impacts to cultural heritage/sacred sites; potential conflict associated with land tenure; and possible benefit exclusion of, or adverse impacts to women, indigenous people and other vulnerable groups. GCF concurs with the AE that the levels of risk associated with these impacts are low to moderate. However, GCF has asked the AE to give more attention to the issues described below.

49. Ecological impacts of agroforestry and revegetation/landscape restoration. Without clear guidelines, these activities could inadvertently result in the introduction and spread of invasive plant species and/or new pests. Also, primary forests could end up being converted into agroforestry areas under the programme. The project should use only native species or species that are already present in the area and have been proven to be non-invasive.
Agroforestry should be undertaken strictly in existing agricultural areas and should not be expanded into existing forests.

50. **Land tenure-related conflicts.** The potential for conflicts, particularly those associated with land tenure, is a concern because of the prevailing land tenure system issue and the post-conflict situation of Timor-Leste. The ESMF indicated that disputed lands would be avoided through the subproject screening. Any potential land issues would be identified and formal documentation of land-use agreements (i.e. owner’s consent, deed of donation, etc.) would be obtained before the subproject is allowed to proceed.

51. **Indigenous peoples.** The Indigenous People’s Standard of the AE is applied to this project because the population at the project site may consist of members of one or several of Timor-Leste’s indigenous ethnic groups. The subprojects, however, are all community-based, and prior consent and broad support are assured through consultation and voluntary participation. The AE should ensure that genuine informed consultations within the influence area of the subproject, including with people who are not members of the beneficiary communities, are undertaken and properly documented. The AE has provided an Indigenous Peoples and Ethnic Minorities Planning Framework describing the processes that will be undertaken to protect the rights of indigenous peoples pursuant to the Indigenous People’s Standard of the AE and the GCF Indigenous Peoples Policy. The Indigenous Peoples and Ethnic Minorities Planning Framework sets out further screening and assessment of impacts in areas where ethnic minority households may be present, provides the principles and processes for meaningful participation and consultation, lays out country policies and laws pertaining to indigenous peoples, and presents the framework for mitigating unintended adverse impacts and ensuring access to the social and economic benefits of the project. The framework also sets out the process and strategy for obtaining free, prior and informed consent as well as the outline of the indigenous peoples plan that will need to be prepared.

52. **Impacts on protected areas of natural habitat.** The ESMF has ruled out any subprojects in protected areas. To ensure that none of the subprojects will fall within any protected areas, the AE has agreed to screen out subprojects that would include activities inside protected areas.

53. **Potential involuntary resettlement impacts.** The construction and rehabilitation of small infrastructure will likely need land/right of way acquisition, particularly for roads, irrigation canals and water supply systems. In addition, economic dislocation is not a remote possibility with the inevitable land-use change/restrictions that accompany catchment management strategies, which may result in loss of income, food gardens or pasture. Consultations and community consent will minimize these impacts but would be inadequate safeguards when those adversely affected are minorities or constitute only a subgroup of the proponent community. To rule out any involuntary resettlement impacts, the AE has agreed to exclude subprojects that would involve involuntary land acquisition and/or involuntary resettlement impacts (i.e. involuntary loss of land, homes, structures and/or trees, and involuntary land-use restrictions). Any land acquisition or land-use restrictions, including participation in agroforestry, shall be strictly voluntary and require the owner’s consent, a waiver or deed of donation.

54. To ensure that high-risk subprojects are not funded, the AE has agreed to adopt a simple screening checklist/form that shall, among other things, be used to determine eligibility/non-eligibility as well as the level and scope of the assessment study to be undertaken. The following subprojects shall not be funded:
(a) Subprojects that would involve construction activities inside any protected areas of natural habitat;

(b) Subprojects that would require displacement of homes and people and/or involve involuntary land acquisition or involuntary loss of structures and crops; involuntary loss/disruptions of livelihood; or land-use restrictions or restrictions of access;

(c) Subprojects involving civil works or revegetation activities on lands whose ownership are being disputed or have unresolved tenure issues;

(d) Subprojects that would convert primary growth forests into agroforestry areas; and

(e) Subprojects that would displace, damage or render inaccessible any national or specific community’s cultural heritage/property.

55. The Environmental Licensing Law vetting process that the subprojects will undergo would likely proceed according to the law and hence cannot guarantee subproject compliance with the requirements in the ESMF. Moreover, the current environmental and social management capacities in Timor-Leste have not been assessed. To ensure that ESMF requirements, including screening, are complied with, the AE has agreed to review and approve each subproject prior to implementation.

56. Extensive consultations were undertaken in developing the project and supporting the environmental and social due diligence. Discussions were held at various levels, including with national/municipal governments and communities and other stakeholders through consultation events held in 2016–2017. A stakeholder engagement plan was also prepared that described the various stakeholders of the project, the principles and strategies for engagement, and the various roles and means of participation. Consistent with the Indigenous Peoples and Ethnic Minorities Framework, the stakeholder engagement plan will need to incorporate the process for meaningful participation and for obtaining and maintaining the free, prior and informed consent throughout the project life. Further, in communities where indigenous peoples are present, the project decision-making process at the community level will need to ensure the representation of indigenous peoples or ethnic minorities to allow their concerns and views to be considered in the project.

57. The ESMF described a project-level mechanism for receiving and resolving complaints from affected and potentially affected people. The project-level grievance redress mechanism describes the eligibility criteria, the process by which the local communities can communicate grievances to the Project Management Unit of the MCIE, the grievance register, and the feedback and resolution process. The project-level grievance redress mechanism is complemented by the stakeholder response mechanism of the AE that is made available to any community or individual with concerns about the impacts of the UNDP project.

58. The MCIE will be the implementing agency and is responsible for implementation and compliance with the ESMF through the collaborating partners and contractors. The ESMF will be part of any tender documentation. The MCIE will be responsible for the revision or updates of this document during the course of work.

4.2 Gender policy

59. The proposal contains a gender analysis and therefore complies with the operational guidelines of the GCF Gender Policy and Action Plan. It also contains a gender action plan.

60. The assessment indicates that Timor-Leste has a favourable environment to promote gender equality through its constitution and the various strategies and strategic development
plans it has developed. The implementation of these commitments, however, is hampered by technical capacity limitations and prevailing norms.

61. The gender assessment provides detailed gender-related information based on literature reviews and on-the-ground consultations with communities. It recognized that women face more vulnerabilities as a result of violence against women, which prevents them from engaging actively in development work and reduces their participation in the labour force and formal employment. Further, there are gender disparities in access to and control over resources. These disparities are detrimental to women and include barriers to women’s access to property ownership, due to patriarchal norms and customary systems. These pose challenges for women to inherit and access land and finance. However, climate change affects both women and men but has differential impacts as a result of the differentiated roles in societies, with women facing many more vulnerabilities.

62. Women have to spend on average two to three hours a day on fetching water either directly from the source or from the nearest communal tap. In addition, the project has identified patriarchal norms and customary systems as the major impediment for women to engage in and benefit equally from the project. Through consultations with women, the project has developed interventions that address the practical needs of women. Securing water for household and farming purposes through climate-resilient water supply systems will bring considerable opportunities for improving women’s daily lives, health and livelihoods. Furthermore, post-disaster recovery and mobility is also impeded due to impassable roads and damaged bridges. As women mainly stay home and do household chores and home gardening, they and their children predominately remain isolated after extreme climate events or disasters. This creates a high level of risk to the lives and health of women and children. Therefore, in addition to improving water supply infrastructure and livelihoods through agroforestry interventions, the project also addresses the issue of mobility by installing climate-proofed and stabilized roads and bridges. The need to implement this intervention as a priority has been verified during consultations, interviews and community meetings with all women groups. The gender analysis has identified various interventions that would allow for increased participation of women as well as the mainstreaming of gender issues in the various policy documents and processes.

63. The gender action plan includes action, targets and indicators, and there are a host of activities identified that will ensure the mainstreaming of gender in the data gathering processes, monitoring and evaluation frameworks on damage and loss accounting, rural infrastructure standards, guidelines and specifications, and guidelines for trainings and capacity-building work. With regard to trainings and capacity-building work, the gender action plan has provided specific targets, including that women should make up 30 per cent of participants in trainings against 14 per cent baseline. The project is also targeting one eligible woman-led contracting company for the construction of infrastructure projects, but the baseline assessments could not identify women-led contracting companies in the infrastructure engineering sector. Given the current level of women’s empowerment in Timor-Leste, the emergence of at least one such company through the incentives set by the project and the provision of a series of trainings to companies could have a catalytic effect. The training series planned is expected to catalyse an upsurge in women’s empowerment through their involvement in setting up micro, small and medium-sized enterprises as contractors. The gender action plan also included activities that promote gender parity policies in the construction companies. The project will prioritize qualified companies whose employment balance is at least 30 per cent women.

64. UNDP has strong expertise in gender and small and medium-sized enterprises (SMEs) and has been implementing the Social Development Programme since 2012 with a particular
focus on SME incubation. UNDP has the experience in Timor-Leste and the gender and SME expertise needed to implement the action plan effectively.

4.3  Risks

4.3.1  Overall program assessment (medium risk):

65. GCF is requested to provide a grant of USD 22.9 million to safeguard rural communities and their assets from climate change-induced disaster by strengthening the capacity of relevant institutions and improving small-scale rural infrastructure in the target areas. The GCF funds will be complemented by co-financing of USD 37.1 million from the Government of Timor-Leste and the AE. This project is building on existing projects (the “Strengthening the Resilience of Small-Scale Rural Infrastructure and Local Government Systems to Climate Risk” and Dili-Ainaro Road Development Corridor projects), considering lessons learned and scaling up interventions, especially for the identification and cost estimation of 130 infrastructure interventions under component 2; and

66. The success of the project depends on the political will to consider climate risks in cross-sectoral policies and legislation. In addition, capacities of relevant government ministries to procure and oversee the service provider for the construction of 130 infrastructure schemes (output 2.2, the main output with 63 per cent of the total project budget and 74 per cent of the total GCF financing), will influence the output.

4.3.2  Capability of accredited entity/executing entity to execute the current programme (medium risk):

67. The AE (UNDP) has been operating in Timor-Leste since 1999. In addition, it has been collaboratively implementing the projects with the executing entity (EE) in the areas of environmental policy and protection; and

68. The MCIE is the EE for the project. It has a track record in implementing the Global Environment Facility's Least Developed Countries Fund project and other donor-funded projects. However, most of the projects recently implemented by the EE are micro-scale (less than USD 10 million). The AE will be relied upon to strengthen the capacity of the EE and provide necessary support during the implementation of the project.

4.3.3  Programme-specific execution risks (medium risk):

69. Erratic internet connection and power supply: the funding proposal and feasibility studies addressed the issue of the erratic internet connection and unstable power supply. This may interrupt the expansion of the database management system, which requires internet connection, and some of the infrastructure, which needs a power supply. The AE stated that the existing database already has internet connectivity and backup power systems. In terms of the infrastructure, while most of the water supply and irrigation systems are gravity-fed systems, there are four water supply systems that require the installation of pumps. It is recommended that GCF resources not be used to finance fossil fuel-powered pumping systems. According to the information provided by the AE, the installation of solar electrification has been considered for the design of the pumping systems, and training for maintaining the solar electrification systems at the community level will be included in the project; and

70. Absorption and operational capacities of responsible parties: the EE will coordinate closely with relevant ministries and experts to implement subactivities and specific outputs. This will include MSA, MSS and MAF. The result of the capacity assessment shows a risk rating
of “significant” for MSA and “moderate” for MSS and MAF. All ministries have difficulties in the areas of staffing, fixed assets management, and financial reporting and monitoring. The funding proposal states that the project will pay close attention to the capacity-building of all relevant agencies via training-of-trainers and the provision of on-the-job training for the staff in the ministries.

4.3.4. Project viability and concessionality:

71. The AE conducted a financial analysis for output 2.2 and provided justifications as to why the financial analysis is not considered pertinent for other outputs. The savings are calculated in the form of avoided losses. It demonstrates that GCF financing in the form of a grant is much needed to strengthen the financial viability compared to the scenario when the grant is replaced with debt financing; and

72. The proposal included an economic analysis. While certain interventions show a negative net present value, the overall project results in an EIRR of 16.2 per cent over 25 years. The viability of the project will depend on the O&M commitment from the Government of Timor-Leste beyond the duration of project implementation.

4.3.5. Compliance risk (medium risk):

73. The GCF Anti-Money Laundering and Countering the Financing of Terrorism Policy (AML/CFT Policy) stipulates that AEs shall be responsible for identifying and mitigating the risks of money laundering and terrorist financing in deploying and managing GCF resources. The funding proposal does not highlight the result of the preliminary money laundering and terrorist financing risk assessment undertaken in the project development phase. However, the AE is bound by relevant provisions in the accreditation master agreement to adopt international best practice standards in its AML/CFT risk control mechanisms and undertake appropriate AML/CFT due diligence consistent with its own policies and procedures. Furthermore, the AE is obligated to ensure the same standards are applied by EEs contracted to implement aspects of GCF funded activities. Given the contractual role of the AE in enforcing and monitoring AML/CFT compliance, it is expected that the associated risk exposure will be effectively mitigated to safeguard GCF resources from misuse; and

74. The Compliance team at GCF has requested additional information from the AE highlighting the project-specific risks and strategic mitigation measures. Pending feedback from the AE addressing these matters. Due diligence has been conducted to check for sanctions and adverse media involving the key parties in the implementation structure. The outcome of the due diligence did not produce any red flags.

4.3.6. GCF portfolio concentration risk (low risk):

75. In case of approval, the impact of this proposal on the GCF portfolio risk remains non-material and within the risk appetite in terms of concentration level, results area or single proposal.

4.3.7. Conclusion (medium risk):

76. It is recommended that any approval by the Board be made after considering the above points.

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<th>Summary risk assessment</th>
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Overall programme | Medium | The capacity of the EE and the commitment of the Government of Timor-Leste to cover operation and maintenance will be critical for the success of the project. The AE is requested to ensure the timely co-financing from the Government and provide the necessary assistance for the EE during the implementation of the project.

Capability of accredited entity (AE)/executing entity (EE) to implement this programme | Medium |

Project-specific execution | Medium |

GCF portfolio concentration | Low |

Compliance | Medium |

### 4.4 Fiduciary

77. The EE for the project is the General Directorate for Environment at MCIE. The MCIE is also the project sponsor, whose mandate is the responsibility for environment and climate change-related policies. As the EE, MCIE will take overall responsibility for the implementation and success of the project and will establish necessary planning and management mechanisms to oversee project inputs, activities and outputs.

78. As the AE, UNDP will require the EE to implement the project in compliance with UNDP rules and regulations and policies and procedures, including its National Implementation Modality Guidelines. These will include relevant requirements relating to fiduciary, procurement, environmental and social safeguards, and other performance standards which will be legally binding via the signing of the UNDP Standard Basic Assistance Agreement by the Government of Timor-Leste as well as a UNDP project document to govern the use of the funds.

79. MCIE will be accountable to UNDP for managing the project, including the monitoring and evaluation of project interventions, achievement of project outcomes and effective use of UNDP resources. In addition, the Government of Timor-Leste has requested UNDP to provide direct project services for this project. These services cover both technical and administrative support and are specified in the draft letter of agreement. The direct project services follow UNDP policies on the recovery of direct project costs relating to GCF-funded projects.

80. UNDP will disburse funding (received from GCF in accordance with the funded activity agreement disbursement schedule) to the MCIE, as the EE, for the purposes of implementing the project. The MCIE will conclude agreements with the three ministries that will be made Responsible Parties, which are responsible for delivering particular project activities in accordance with their institutional mandates (to be detailed during the formulation of the project document).

### 4.5 Results monitoring and reporting

81. As an adaptation project, the proposal reports that the project is expected to impact an anticipated 175,840 direct beneficiaries (89,643 men, 86,197 women; 19,751 households), which is an estimated 15 per cent of the total population. Benefits include increased climate resilience for small-scale infrastructure as well as 300 ha of reforested and rehabilitated land to buffer against climate-induced disasters.

82. The timetable of implementation in section C.8 has been revised as per earlier comments and conforms with the standard GCF format.
83. The logic framework in section H.1 is in line with the Fund’s PMF.

84. The monitoring and reporting timeline in section H.2 complies with GCF reporting requirements.

4.6 Legal assessment

85. The accreditation master agreement with the AE was signed on 5 August 2016 and became effective on 23 November 2016.

86. The AE has provided a legal opinion/certificate confirming that it has obtained all internal approvals and it has the capacity and authority to implement the project.

87. The proposed project will be implemented in Timor-Leste, a country in which GCF is not provided with privileged and immunities. This means that, among other things, GCF is not protected against litigation or expropriation in this country, the risks of which need to be further assessed. The Secretariat submitted a draft privileges and immunities agreement to the government of Timor-Leste on 7 April 2016. So far, no response has been received.

88. The Heads of the Independent Redress Mechanism and Independent Integrity Unit have both expressed that it would not be legally feasible to undertake their redress activities and/or investigations, as appropriate, in countries where GCF is not provided with relevant privileges and immunities. Therefore, it is recommended that disbursements by GCF are made only after GCF has obtained satisfactory protection against litigation and expropriation in the country, or has been provided with appropriate privileges and immunities.

4.7 List of proposed conditions (including legal)

89. In order to mitigate risk, it is recommended that any approval by the Board is made subject to the following conditions:

(a) Signature of the funded activity agreement in form and substance satisfactory to the Secretariat within 180 days from the date of Board approval; and
(b) Completion of legal due diligence to the satisfaction of the Secretariat.

DISCLAIMER:

This assessment sheet is a working draft and contains a preliminary assessment by the Green Climate Fund (“GCF”) Secretariat of the funding proposal to which it refers, which remains expressly subject to further due diligence and review by the GCF Secretariat.

Any draft assessment sheet prepared and provided by the GCF Secretariat to the independent Technical Advisory Panel of the GCF is a deliberative document and, therefore, is to be treated as information not to be publicly disclosed pursuant to the information disclosure policy of the GCF. This draft assessment sheet is intended for use as a reference by the independent TAP members only and may not be disclosed to any third party, nor be cited or quoted in part or in whole.
Independent Technical Advisory Panel’s assessment of FP109

Proposal name: Safeguarding rural communities and their physical and economic assets from climate induced disasters in Timor-Leste

Accredited entity: United Nations Development Programme (UNDP)

Project/programme size: Medium

I. Assessment of the independent Technical Advisory Panel

1.1 Impact potential

1.1.1 Adaptation impact

Scale: High

1. Timor-Leste is a least developed country with a heavy reliance on agriculture for subsistence and income generation (approximately 75 per cent of its population is employed in the agriculture sector). Thus, the country is highly vulnerable to the impacts of climate change, which include higher rainfall variability (predicted to decrease in the dry season and increase in the wet season), temperature increases and more frequent extreme climatic events. These changes would result in an increase of soil erosion, flood occurrence, landslides, crop failure, water shortages and damage of public and private infrastructure in a business-as-usual scenario.

2. The project seeks to safeguard rural communities from the impacts of climate change by enhancing the climate resiliency of small-scale rural infrastructure, including water supply systems, rural roads and bridges, flood defences and irrigation systems in the six more vulnerable municipalities of the country.

3. The project consists of two main components. Component 1 includes the development of climate risk information services and vulnerability mapping; the creation of a database system for monitoring, recording and accounting for climate-induced damages; and the integration of climate resiliency into policies, regulations and institutions to inform climate-resilient small-scale rural infrastructure planning and management. Component 2 focuses on the implementation of climate-proofing measures for small-scale rural infrastructure, which would include the re-vegetation of land around rural water supply systems; formalization and enhancement of existing and new water supply and rural irrigation systems; rehabilitation of rural bridges and slope stabilization of rural road corridors; installation of climate-resilient rural flood defences; and implementation of agroforestry and reforestation as ecosystem-based adaptation activities to re-establish ecosystem functions. Climate risk reduction criteria would be integrated into the ongoing District Investment Development Plan (PDIM) at the municipal level and the National Programme for Suco Development (PNDS) at the village level.¹

4. The design and implementation of rural infrastructure under activity 2.2 would be guided by cost-benefit assessments, vulnerability mapping, and other tools to be introduced by the project under component 1.

5. The proposed interventions on rural infrastructure (activity 2.2) would directly benefit approximately 119,000 people (almost 15 per cent of the population of Timor-Leste).

¹Funding proposal, paragraph 28.
Agroforestry and reforestation activities (activity 2.3) would cover approximately 300 hectares and benefit 56,000 people. When questioned by the independent Technical Advisory Panel (iTAP) on the possibility of double-counting beneficiaries of individual infrastructure works and ecosystem-based adaptation activities (for example, people benefiting from water supply schemes, flood defences and/or agroforestry activities at the same time), the United Nations Development Programme (UNDP) responded that the number of beneficiaries was carefully estimated for each activity, based on community consultations, to avoid double-counting.\(^2\) The total indirect beneficiaries are estimated as the whole population of the targeted districts, which is 522,000 and represents 44 per cent of the total national population.

6. The proposed interventions will reduce the climate risk vulnerability of targeted populations. Direct benefits would include improved water availability for domestic use and irrigation purposes during drought periods, better and more diverse crop yields, increased water quality,\(^3\) reduced damages to private and public infrastructure due to flooding and extreme climatic events, and enhanced livelihoods.

7. Regarding the strengthening of institutional and regulatory systems, the project will develop and deliver climate risk and vulnerability assessments; cost-benefit assessments for adaptation alternatives; project appraisal techniques; a set of revised standards, guidelines and specifications for rural infrastructure; and training courses to public institutions on infrastructure planning and development and climate-induced disaster risk management (activities 1.1 and 1.3).

8. To support the generation and use of climate risk information, the project will invest in developing a risk management application for the storage, analysis and management of disaster data, allowing users to estimate the economic damages caused by climatic events and evaluate the efficiency of the adopted measures (activity 1.2).

9. Although the proposal recognizes that the availability of hydro-meteorological data is limited, and that for this reason the design of water supply systems do not consider climatic hazards,\(^4\) the project does not include interventions directed towards supporting hydro-meteorological data generation. When questioned by iTAP on this matter, the proponent responded that the limitations of the hydro-meteorological network in the country are being addressed by other organizations and entities that are supporting the Government of Timor-Leste in enhancing the observation network.

10. The preliminary design of water supply and irrigation systems included the identification of water sources and the determination of their capacity to supply water to the communities through site reconnaissance and initial surveys on elevations, total hectares of lands that could potentially be irrigated, types of agricultural activities and crops that farmers were engaged in, and cropping patterns.

11. All project interventions are coupled with capacity-building activities. This would help to create awareness of climate threats and risk reduction processes among public institutions and the general population, and support the sustainability of project outcomes.

12. In responses to questions from iTAP raised prior to the twenty-second meeting of the Board (B.22), the accredited entity (AE) indicated that:

\[\text{Decree Law 3/2016 now embeds [operation and maintenance (O&M)] responsibility under the respective Municipal Service with [Ministry of State Administration] having overall financing and implementation responsibility for small scale rural infrastructure O&M.}\]

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\(^3\) See comments on water, sanitation and hygiene in the following paragraphs.

\(^4\) Feasibility study, page 63.
13. Furthermore, the AE indicated that:

With regard to long-term O&M financing, the project will embed financing models for investment maintenance costs (e.g. of community-based schemes that involve the use of tariffs or in-kind contributions to establish municipal maintenance programmes, and will seek to engage the private sector in infrastructure maintenance financing)

and that:

Setting up willingness-to-pay surveys is embedded into the PDIM and PNDS (baseline development investment programs) infrastructure prioritization exercise.

14. The proponent clarified that preliminary willingness-to-pay data was obtained from the previously implemented “Strengthening the Resilience of Small-Scale Rural Infrastructure and Local Government Systems to Climate Risk” (SSRI) project, the Community Score Card process (run in eight trial communities across Timor-Leste), and from informal surveys.

1.2 Paradigm shift potential  

Scale: Medium

1.2.1 Potential for knowledge and learning

15. The project is not the first effort to support the implementation of community-led agroforestry activities in Timor-Leste. The feasibility study in section 7.1, describes previous governmental and non-governmental interventions.

16. The monitoring and evaluation plan would comply with the UNDP Programmes and Operations Policies and Procedures, the UNDP Evaluation Policy and the GCF additional requirements. The procedures to monitor and evaluate project impacts, as described in the funding proposal, are deemed adequate.

17. The damage database system planned under activity 1.2 and the consequent capacity to evaluate the efficiency of adaptation measures would serve as the main tool to facilitate the sharing of climate risk knowledge so that such knowledge can be used in other projects. Other than that, the funding proposal does not describe specific activities aimed at disseminating lessons learned throughout the country or region.  

1.2.2 Contribution to the creation of an enabling environment

18. To ensure the sustainability of outputs beyond the project lifespan, the funding proposal includes the following components: (1) capacity-building for public institutions on climate risk management and adaptation alternatives; (2) mainstreaming of climate resiliency knowledge and related assessment tools in legal frameworks, policies and planning frameworks, and specifically in the PDIM and PNDS programmes; and (3) the income generation capacity of the proposed agroforestry activities.

19. The increased diversity and volume of agricultural production due to the implementation of agroforestry activities has the potential to expand the market for agricultural products. The project would reduce disruption to product transportation thanks to rehabilitated and climate-proofed roads and bridges. The draft Agricultural Policy and Strategic Framework described on section 4.5.1 of the feasibility study includes actions aimed at strengthening market opportunities through inclusive and efficient value chain development and improved community and private sector participation in all subsectors.

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5 See recommendation from iTAP to the AE in paragraph 24.

6 Feasibility study, page 84.
1.2.3 Contribution to regulatory framework and policies

20. Climate risk information services, vulnerability mapping and the damage database would help promote the development of climate-resilient rural infrastructure.

21. The project would specifically support the mainstreaming of climate change considerations into policies, regulatory frameworks and decision-making processes through activity 1.3. This activity includes the revision and enhancement of the existing normative framework and the creation of a new set of standards, guidelines and technical specifications for climate-resilient rural infrastructure; the integration of the new and revised specifications into sectoral plans such as the Rural Roads Master Plan & Investment Strategy 2016–2020 and the National Water Supply Policy and Strategic Plan; and the delivery of related training courses to technical staff and groups of engineers.7

1.2.4 Scalability and replicability

22. The strong focus on capacity-building for governmental institutions at village, municipal and national levels gives the project a high replication potential in the six targeted municipalities as well as in the rest of the country.

23. Also, the implementation of a climate risk information system that can be applied at a national level and the set of standards, guidelines and technical specifications for climate-resilient rural infrastructure would support the climate resiliency of infrastructure to be designed in the future.

1.3 Sustainable development potential

1.3.1 Environmental co-benefits

24. Environmental co-benefits generated from the implementation of agroforestry and reforestation activities include 300 hectares of rehabilitated forest cover through GCF financing and a further 1,200 hectares from government co-financing, which will benefit over 200,000 people. Co-benefits include reduced soil erosion, land stabilization, improved water quality, enhanced biodiversity, and regulated hydrological flows (buffer runoff, soil infiltration, groundwater recharge, maintenance of base flows).

1.3.2 Social co-benefits

25. Project interventions will help to increase the safety and protection of the local population from climate events by enhancing the climate resiliency of rural infrastructure.

26. Agroforestry activities will improve food security and promote climate-resilient livelihoods.

27. A secure water supply has the potential to reduce public health expenditures and avoid income loss due to illness and time dedicated to procure safe water. However, this potential can be diminished or even reversed without simultaneous sanitation and hygiene measures.8

28. Based on the information provided in this funding proposal, only 27 per cent of the population in rural areas has access to improved sanitation. Even though the funding proposal

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7 Funding proposal, paragraph 53.
8 “... whilst substantial benefits can be realised from providing access to water, sanitation and hygiene, there may also be some “disbenefits” along the way, depending on the sequencing of investments (for example, if access to water is provided without simultaneous access to sanitation).” OECD (2011), Benefits of Investing in Water and Sanitation: An OECD Perspective, OECD Publishing.
does not consider the inclusion of improved sanitation activities, several ongoing water, sanitation and hygiene (WASH) initiatives will promote hygiene awareness, which, as stated by the proponent, would cover almost 100 per cent of the beneficiaries of the present proposal.\(^9\)

29. In reference to improved sanitation, iTAP evaluated the table presented by the project proponent. The analysis indicated that improved sanitation projects by other entities would be taking place in three out of the seven targeted municipalities, covering 100 per cent of the drinking water interventions by this funding proposal. However, the timing and extent of these projects were unknown. With respect to the other four municipalities, the improved sanitation interventions by third parties did not seem to cover the area addressed by this funding proposal.

1.3.3 Economic co-benefits

30. The implementation of resilient irrigation systems and agroforestry practices will promote improved crop productivity and diversity, thus increasing household incomes.

1.3.4 Gender-sensitive development impact

31. The project would include activities aimed at mainstreaming gender aspects into the PDIM and PNDS programmes to ensure women’s involvement in the prioritization and design processes. The Gender Action Plan would draw lessons learned from the SSRI project.

32. Women are traditionally in charge of fetching water and usually have to walk long distances. The implementation of new water supply systems with public taps would considerably reduce this burden, which in turn will free time for activities of economic value.

1.4 Needs of the recipient

Scale: High

1.4.1 Vulnerability of the country, vulnerable groups and gender aspects

33. Timor-Leste is highly vulnerable to climate risks such as rainfall variability, increased temperatures, and extreme events, which would be exacerbated by climate change. The degree of isolation and the socioeconomic conditions of the rural population make them even more vulnerable.

34. Women are considerably disadvantaged in relation to access to resources such as land, capital and credit, as well as access to agricultural inputs and technology, training, information and marketing services.\(^10\)

35. The project targets the most vulnerable in terms of poverty, infrastructure and basic public service deficits, social vulnerabilities, and levels of exposure to climate risks. The identification and prioritization of rural infrastructure projects was based on the “Analysis of Climate Change Risks, Impacts and Vulnerability for Baseline and Projected Climate Change Scenarios” study carried out in 2016.\(^11\)

1.4.2 Economic and social development

36. Timor-Leste is a post-conflict low-income country, with a poverty rate estimated at 49 per cent. Over 70 per cent of the population is engaged in subsistence agriculture (80 per cent for women). Due to high poverty and defective infrastructure and public services, 20 per cent of the population suffers from food insecurity, and an additional 24 per cent are vulnerable to food

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\(^9\) FP-UNDP-130519-5910-responses to iTAP comments.pdf, answer to question 4.2 and table 1.

\(^10\) Funding proposal, paragraph 161.

\(^11\) Feasibility study, page 207.
insecurity. Increased climate variability and extreme events are expected to worsen the situation.

37. Timor-Leste gained its independence from Indonesia in 1999 and since then has been facing great challenges in rebuilding its infrastructure, strengthening institutions and generating jobs.

38. The villages with the lowest living standards are the most remote and least populated. Between the 89 villages with the lowest living standards, the average share of households with electricity is only 3 per cent, while in villages with higher living standards the average share is 66 per cent. Access to improved water and sanitation is also much higher in villages with high living standards. In rural areas, 57 per cent has access to improved drinking water (main source of drinking water is from a well or spring (25 per cent), and 25 per cent has access to improved sanitation facilities. Water shortages are common in many areas in the dry season.12

1.4.3 Absence of alternative sources of financing

39. The value of the indicator “domestic credit provided by financial sector” is negative for the country (–53.6 per cent of gross domestic product as per the funding proposal; –7.2 per cent as per World Bank data for 2017). This indicates a weak domestic financial framework and reflects limited access to finance.

1.4.4 Need for strengthening institutions and implementation capacity

40. The proposal recognizes and addresses a series of barriers to the implementation, operation and maintenance of climate-resilient small-scale rural infrastructure, including incomplete policies, standards and regulations, limited technical capacity, and weak capacity of municipal and village-level institutions. Approximately 15 per cent of the total project budget of USD 59 million would be allocated to activities aimed at overcoming these barriers (activities 1.1, 1.2, 1.3 and 2.1). All in all, the proposal has a strong focus on institutional strengthening and capacity-building.

1.5 Country ownership

1.5.1 Alignment with national climate strategy and policies

41. The project is aligned with the adaptation priorities concerning climate risk reduction, protection of forests and watershed rehabilitation described in the national adaptation programme of action.

42. The project is also in line with several Sustainable Development Goals, the Government of Timor-Leste’s Strategic Development Plan for 2011–2030, the draft National Climate Change Policy, the revised draft of the National Forest Policy, and the Strategic Development Plan 2014–2020 of the Ministry of Agriculture and Fisheries (MAF).

1.5.2 Capacity of accredited entities or executing entities to deliver

43. UNDP has extensive experience in the implementation of climate adaptation projects, including projects related to climate-resilient livelihoods, ecosystem-based adaptation, food security, climate-resilient infrastructure and public services. UNDP has been working in Timor-Leste since they gained their independence in 1999. In 2017 UNDP managed a climate change and disaster risk reduction portfolio of USD 18 million.

12 Feasibility study, pages 11 and 12.
44. The executing entity (EE) would be the Ministry of Commerce, Industry and Environment (MCIE). The GCF, Global Environment Facility (GEF) and United Nations Framework Convention on Climate Change (UNFCCC) focal points and designated national authority for Timor-Leste sit within MCIE. The main programmes implemented by MCIE together with United Nations agencies include Cross Cutting Capacity Development, GCF Readiness Support to Timor-Leste, Local Government Systems to Climate Variability and Risk, Renewable Energy Project, Second National Communication Project, SSRI and Strengthening Community Resilience to Climate-induced Disasters in the Dili to Ainaro Road Development Corridor.

45. Beneficiary institutions also include MAF, the Ministry of Public Works, Transport and Communication, the Ministry of Social Solidarity, MSA and subnational authorities (Aileu, Baucau, Ermera, Lautém, Liquiçá and Viqueque municipalities). The MSA was the main implementing agency, together with MCIE, for the SSRI project and it would be responsible for the integration of climate risk reduction methods into the planning and budgeting cycles of village and municipal development plans, and for the implementation of climate-proofing measures for small-scale rural infrastructure (activities 2.1 and 2.2).

1.5.3 Engagement with civil society organizations and other relevant stakeholders

46. The project was designed in close collaboration with the national designated authority since the inception phase and included consultations with relevant governmental institutions at national, municipal and community levels.

47. Even though community leaders were consulted about the acceptability of the project, community consultations did not include workshops for the participation of the general public.

1.6 Efficiency and effectiveness

1.6.1 Cost-effectiveness and efficiency

48. Ecosystem-based adaptation interventions are more effective in the long-term than hard engineering measures and would help to reduce the cost of maintaining new and rehabilitated infrastructure by diminishing its exposure to climate hazards.

49. The integrated approach, covering capacity-building, institutional strengthening, risks and vulnerability assessments, infrastructure development and ecosystem-based adaptation measures, adds to the efficiency and sustainability of project activities.

50. Given that rural infrastructure activities comprise 130 individual subprojects in various sectors (roads, irrigation, drinking water, etc.), it was not possible to assess the expected related costs and cost-effectiveness of each intervention. The cost of infrastructure was estimated based on the unit costs of the SSRI project.  

1.6.2 Amount of co-financing

51. The Government of Timor-Leste would provide financing for 62 per cent of the total project cost.

52. During the assessment of the funding proposal at B.22, iTAP concluded that “the efficiency and effectiveness of the proposed interventions are reduced to a low rating due to uncertain operation and maintenance cost estimations and sources to secure their financing.” For the present revision of this proposal for B.23, operation and maintenance (O&M) estimates are not available.

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13 Funding proposal, paragraph 66.
are included in the project budget. The financial analysis estimates O&M costs from year 3 to year 20 at a total of approx. USD 29.4 million. In addition, the proponent included a co-financing commitment letter confirming the Government of Timor-Leste’s intention to allocate USD 29.4 million for the O&M of the 130 infrastructure subprojects from year 3 to year 20.

1.6.3 Financial viability

53. Being of a public goods nature, project outputs do not involve cost recovery. Indirect revenue generation would come from the enhanced income of households implementing agroforestry practices and reduced health expenditure and income loss.

54. Preliminary cost-benefit analyses were carried out for each of the 130 infrastructure schemes. For the estimation of avoided damage, the same frequency was used for all four considered hydro-meteorological hazards.

55. Due to the lack of historical data on damage caused by climatic events and to allow for the comparison of costs and benefits of all rural infrastructure, losses were assumed for each scheme with the same frequency. For this reason, the internal rates of return (IRRs) are only useful for ranking scheme viability.

56. Approximately 50 per cent of all flood control infrastructure are not reported to avoid damage to property or crops. It is not clear if this assumption is based on a lack of data and conservativeness.14

57. The financial analysis includes costs saved by avoiding economic losses, transportation losses, disruption losses, and erosion losses on an annual basis. It showed an IRR of 13 per cent and a net present value of USD 41 million.

1.6.4 Best practices

58. The designs for the small-scale rural infrastructure included under activity 2.2 (flood defences, water supply and irrigation systems, and roads and bridges) were based on tested climate-proofing prototypes from the GEF-funded SSRI project. For this reason, the description of this infrastructure does not present detail on the technical aspects or design processes.15 For example, to be able to evaluate the potential of the proposed irrigation and water supply systems to cope with drought periods, it would be necessary to analyse spring and ground water availability during normal and drought periods, availability of surface water for irrigation, and sizing of storage tanks. However, iTAP considers that the large number of small-scale interventions would make this analysis cumbersome at this stage.

59. The incorporation of physical protection, settlement chambers and filter membranes in intake structures of springs and the stabilization of catchment area and erosion control through tree planting would help to ensure water quality. A description of intake structures showing these features was submitted as a response to iTAP questions.16

60. The project builds upon the lessons learned during the implementation of the SSRI project and reinforces the interventions in the PDIM and PNDS programmes in order to fully achieve the integration of climate resilience considerations into infrastructure design, implementation and O&M. The SSRI project delivered capacity-building to policymakers and the public and involved a series of rural infrastructure interventions, including water supply and irrigation systems, roads and bridges, and flood defences. The capacity-building components of the present project would be guided by the capacity development needs assessment and

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14 See “Project List Summary” of the “FP-UNDP-301118-5910-Annex XIII _h-2_ IRR Flood Control.xlsx”.
15 See Feasibility Study, section 11.11.
capacity development strategy formulated under the SSRI project and would scale up and complement the trainings under the SSRI project.

61. Other best practices come from the lessons learned through the UNDP-supported Dili-Ainaro Road Development Corridor Project which focused on strengthening the institutional and technical capacities of subnational government officials to plan and implement ecosystem-based adaptation approaches, specifically agroforestry projects.

62. The proposed project will provide only water supply systems/infrastructure with no physical intervention/infrastructure for sanitation. Actions related to raising awareness on hygiene practices in the target communities would be implemented in coordination with other ongoing projects in the region, covering 100 per cent of the targeted populations, as described in the response to the iTAP questions.  

II. Overall remarks from the independent Technical Advisory Panel

63. The iTAP recommends that the Board approve this funding proposal.

64. To make sure the whole set of benefits deriving from water supply schemes from this funding proposal materialize, the AE must meet the following:

(a) Condition precedent to all disbursements for drinking water supply interventions under activity 2.2:

(i) Delivery to the GCF by the accredited entity of evidence, in form and substance satisfactory to GCF, that hygiene and improved sanitation interventions to be provided by third parties are in place before, or are put in place simultaneously with, the drinking water intervention, as described in the funding proposal. For the avoidance of doubt, evidence may include, but not be limited to, the letter of commitment by a third party including a description of the project, availability of funding, project budget, schedule and area of influence; and

(b) Covenant:

(i) The accredited entity shall ensure that the GCF Proceeds will not support or finance, directly or indirectly, any activities in relation to drinking water supply intervention in targeted municipalities that do not satisfy the requirements of the condition precedent to all disbursement set out above.

65. With this condition, the iTAP considers that both project impact and contribution to sustainable development can be rated as high.

66. The iTAP recommends that the AE develop and describe specific activities aimed at disseminating lessons learned throughout the country or region.

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17 FP-UNDP-130519-5910-responses to iTAP comments.pdf, answer to question 4 and table 1.
18 See iTAP comments under (b) Social Co-benefits in Section 1.3 Sustainable Development Potential.
Response from the accredited entity to the independent Technical Advisory Panel's assessment (FP109)

Proposal name: Safeguarding rural communities and their physical assets from climate induced disasters in Timor-Leste

Accredited entity: United Nations Development Programme (UNDP)

Impact potential

The High rating is noted.

Paradigm shift potential

The Medium rating is noted.

Related to the assessment of the 'Potential for knowledge and learning', the AE would like to clarify that the project will facilitate the dissemination and sharing of common and definitive climate risk information needed by all sectors to embed climate risk considerations into their functions as well as develop skills and capacities for systematic generation and provision of climate risk information to the local investment programmes (PDIM and PNDS) and beyond.

More specifically, under the Output 1, the project will establish an information platform which will consist of a national e-Library, databases, information systems and knowledge portal with integration with social media and mobile application to increase community engagement and allow two-way flow of information. The project will develop and disseminate manuals, tools, and methodologies related to climate hazard and risk assessment, climate risk management, risks and vulnerability assessments, engineering practices for climate-proofing of small rural infrastructure, among others. A series of trainings to mandated institutions will be conducted to disseminate this knowledge and relevant institutions at national and sub-national level will be strengthened to embed such knowledge and skills for continuity of the learning process. The learning and capacities for the social resilience of communities will be strengthened through a robust knowledge management approach at the community level, utilizing existing CCAPRID - Capacity Development on Climate Change Adaptation Planning for Rural Infrastructure Development and CAMP - Community Action Management Plan processes.

The project provides many opportunities for formal learning, awareness raising and capacity building cut across almost all outputs and activities. These sets of measures will catalyse longer-term learning and short-term professional training/retraining programs targeting all stakeholders, including vulnerable communities, local governments, universities and relevant authorities. The project will also undertake impact evaluation to systematically generate lessons learned and the evidence base for project interventions at the community level.

Sustainable development potential
The High rating is noted.

**Needs of the recipient**

The High rating is noted.

**Country ownership**

The High rating is noted.

**Efficiency and effectiveness**

The Medium to High rating is noted.

The GoTL has provided an overall financial commitment for O&M of 20 years in total (Annex IV(b)). The project develops the O&M costing, budgeting and implementation capacities for the PDIM and PNDS process as integral to climate proofing of infrastructure development and long-term investment planning for all small scale rural infrastructure. Asset inspection and condition monitoring measures that are new to Timor Leste will include monitoring of hazard incident on asset, damages and losses accounting to determine remedial measures and associated costs, are all new tracking methods which will iteratively inform O&M costing and budgeting in the future. Hence, the project is developing long-term, climate risk-informed infrastructure investment strategies which will help government to identify the infrastructure O&M needs and mechanisms, and can contribute to the reduction in O&M costs due to the climate proofing of infrastructure by this project.

**Overall remarks from the independent Technical Advisory Panel:**

AE acknowledges the iTAP’s recommendation of the project to the Board.

Related to the condition and covenant, the AE notes that during project formulation, under the leadership of Director General, and as part of the National Water Forum set up at the Department of Water and Sanitation of the Ministry of Public Works, consultations were held and cooperation agreed with WaterAid, UNICEF, WHO and other agencies who have sanitation and hygiene interventions in rural communities. A signed the letter of commitment for cooperation has been obtained (Annex XIII (d-2) – Annexure 1). All consulted organizations confirmed that the key limitation to sanitation is a lack of water delivery infrastructure. Hence, the increased availability and reliability of water supply to households through the climate proofed water supply units to be implemented by the GCF project means that households will be more inclined to install improved sanitation methods that require the use of water, such as the pour-flush toilets, and additionally benefit from interventions from NGOs and other organizations that are actively supporting sanitation practices. This is fully in line with the government’s National Sanitation Strategy that aims at full CLTS targets by 2020-21.

The AE, with the Director General as part of the project steering committee, will ensure continued, active participation in the National Water Forum that houses the coordination mechanism across all WASH initiatives in the country. AE will continue tracking and collecting sanitation data and will provide the updated information on complementary sanitation investments at the inception stage of the project implementation, and annually, as required.
addition, the AE will sequence implementation of climate proofing of infrastructure to ensure that complementary investment in sanitation is in place.

AE also notes the recommendation related to dissemination of lessons and will further develop the series of project activities (e.g. 1.1.5, 1.1.9, 1.2.4, 1.3.6, 1.3.7, 2.1.1, 2.1.2, 2.1.7) that are specifically focused on training (including TOTs), learning of new skills and methods, knowledge generation (e.g. hazard and socio-economic modelling for risk knowledge) and building capacities across all levels of decentralized governance for public investment into the small-scale rural infrastructure.
Annex XIII (c)
Gender Assessment and Action Plan
Safeguarding communities and their physical assets from climate induced disasters in Timor Leste
I. INTRODUCTION

Background

The proposed project is designed to safeguard vulnerable communities and their physical and economic assets from climate change induced disasters in Timor-Leste. The proposed project aims to address the existing barriers and shift the baseline scenario towards climate resilience. The project will directly benefit 19,751 households, comprising 15% of the total population. The direct beneficiaries of the project are 175,840 (89,643 males, 86,197 females) and the indirect beneficiaries are 346,160 (176,473 males, 169,687 females) living in the six municipalities. The proportion of men and women benefitted by the project is almost the equally balanced – 51% males and 49% females.

Previous assessments undertaken to understand the gender roles and the differential impact of climate induced disaster risks and climate shocks have underscored the established notion that women, children and elderly are more vulnerable to the negative impacts of climate change. To assess if this widespread notion holds true in case of Timor-Leste or not, UNDP had undertaken a four-way gender analysis in six municipalities to assess:

a) the overall differential impact of climate change and disaster risks and existing coping mechanisms and adaptive capacity in six municipalities on men and women;

b) impact of the climate resilient small scale rural infrastructures and community based adaptation measures on the lives and livelihood of men and women and;

c) role of women in contributing towards gender responsive planning and building resilience at the community level;

d) policy gaps that need to be addressed to strengthen and foster mainstreaming gender into climate and disaster risk management interventions.

This gender assessment\(^1\) provides an overview of the gender situation in Timor-Leste in the context of the impact of climate change, coping mechanisms, climate vulnerabilities, policy gaps, institutional capacities and the need assessment to better address the existing gender based differential challenges and opportunities. The assessment explored both existing and potential mechanisms to aid in mainstreaming gender into the overall development activities, with emphasis on climate resilient development.

The gender assessment was based on primary data collection through site visits, where key informant interviews and focused group discussions were conducted along with consultation workshops with the key stakeholders at both national and sub-national levels. This was

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\(^1\) While women are the largest vulnerable group that suffer from discrimination and exclusion, other minority groups such as disabled people, elderly, youth, LGBTI and ethnic minorities often suffer similar issues and therefore actions described in the GAP may also be applicable to them. Where an action can have benefits beyond purely gender aspects, it should be read to include and apply to other vulnerable groups as relevant.
complemented by further analysis of the gender related documents, policies and climate change policy instruments through a desk review.

a) **Primary Data collection:**

With the insights from the secondary information, primary data collection was prepared, such as checklists for interviews, identification of appropriate & context specific gender assessments tools, and other participative approaches to support the gender assessment.

Throughout the community engagement, the study team undertook several initiatives to ensure integration of women such as holding women-only focus group discussions, or separating women and men. These enabled women to express their concerns and perspectives freely. A concluding 2-day validation workshop held between 23rd- 24th March 2017 also served to obtain some additional information that was not possible to obtain during the field visit and consultations with stakeholders.

b) **Desk Review:**

The assessment made use of available resources and insights from primary data collection to inform and strengthen the analysis with specific focus on the core components of the climate change (adaptation, resilience and disaster risk management) aspects. Documents and literature consulted primarily consist of:

i) Literature (international) on gender and climate change and DRR;

ii) Literature on climate change and disaster risks on Timor-Leste; and

iii) Key relevant documents pertaining to existing policies and gender mainstreaming instruments and tools adopted in Timor-Leste

iv) Programme documents, narrative reports, country report on risks analysis and other documents and various materials produced within the scope of the two projects
II. GENDER EQUALITY AND SOCIAL INCLUSION IN TIMOR-LESTE

Gender Inequality Index

Timor-Leste’s Gender Development Index (GDI)\(^2\) value and its components are comparative to selected countries and groups; the GDI reflects gender-based inequalities in three dimensions – reproductive health, empowerment, and economic activity and calculated for 161 countries.

### Timor-Leste’s GDI value and its components relative to selected countries and groups

<table>
<thead>
<tr>
<th></th>
<th>Life expectancy at birth</th>
<th>Expected years of schooling</th>
<th>Mean years of schooling</th>
<th>GNI per capita</th>
<th>HDI values</th>
<th>F-M ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>M</td>
<td>F</td>
<td>M</td>
<td>F</td>
<td>M</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>70.1</td>
<td>66.5</td>
<td>11.3</td>
<td>12.0</td>
<td>3.6</td>
<td>5.3</td>
</tr>
<tr>
<td>Fiji</td>
<td>73.2</td>
<td>67.2</td>
<td>16.0</td>
<td>15.5</td>
<td>9.8</td>
<td>10.0</td>
</tr>
<tr>
<td>East Asia</td>
<td>76.0</td>
<td>72.2</td>
<td>13.0</td>
<td>12.8</td>
<td>6.9</td>
<td>8.0</td>
</tr>
<tr>
<td>the Pacific</td>
<td>70.6</td>
<td>66.8</td>
<td>11.5</td>
<td>11.8</td>
<td>4.9</td>
<td>7.3</td>
</tr>
</tbody>
</table>


The following sections illustrate the sector specific gender disparities. For example, in the economic sector, the existing patriarchal system in Timor-Leste undermines women vis-à-vis men and subsumes their contribution to society even when they are educated or come from wealthy households.\(^3\) Women’s contribution to the economic sector is significant, yet their contributions are not fully acknowledged and made ‘visible’.

- **Violence against women and girls** in Timor-Leste, is a widespread problem and has largely prevented women in participating actively in all aspects of development.\(^4\) This is evident from police data of high incidence of reports of gender-based violence and specifically domestic violence, which was the most frequently reported crime across all districts of the country between 2000 and 2009.\(^5\) The 2009-2010 Demographic

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\(^2\) UNDP. 2015. Human Development Index. Work for Development. Briefing note for countries on the 2015 Human Development Report. Timor-Leste; Note: Gender Development Index (GDI), introduced in 2014 is a new measure based on the sex-disaggregated Human Development Index, defined as a ratio of the female to the male HDI. The GDI measures gender inequalities in achievement in three basic dimensions of human development: health (measured by female and male life expectancy at birth), education (measured by female and male expected years of schooling for children and mean years for adults aged 25 years and older); and command over economic resources (measured by female and male estimated GNI per capita).

\(^3\) USAID- ADAPT Asia Pacific.2014. Strengthening Community Resilience to Climate Induced Natural Disasters in Timor-Leste. Gender Report. P.16


Health Survey (DHS) found that 35% of women aged 15-49 have experienced physical violence in their lifetime, with 29% of women experiencing physical violence often or sometimes in the past 12 months. The DHS survey also reported that about 3% of women aged 15-49 have experienced sexual violence. Social acceptance of domestic violence also impedes the implementation of the law.

- **Participation in Labour Force** within the existing patriarchal system in Timor-Leste undermines women vis-à-vis men and subsumes their contribution to society even when they are educated or come from wealthy households. Women’s contribution to the economic sector is significant, yet their contributions are not fully acknowledged and made ‘visible’. This is exemplified by data showing gender disparities in labour force participation rate, that varies significantly by age:
  - Among men, the participation rate is above 80% for those aged 30–49, and it is also higher for those in urban areas than those in rural areas.
  - Among women, the participation rate is higher for relatively older age groups: those aged 55–59 in urban areas and those aged 45–49 and 55–59 in rural areas.
  - Compared with men, labour participation among women aged 30–34 and 35–39 (in rural areas) is low, showing the largest gender gap in these age groups. This large gender gap suggests that women of prime childbearing and childrearing ages including women’s household responsibilities, especially child care, are likely to constrain their engagement in the labour market.

The disparities in labour force participation with lower participation of women illustrates a statistical bias of the term as adopted in most labour force surveys; for example, people engaged in work solely for household consumption, such as tending to the family garden, are not counted as “employed” to capture primarily market-oriented jobs and track trends in the labour market.

- **Gender disparities in the formal sector** means only 39 percent of females are employed or available for work, compared to 69 percent of males. Whilst over 55 percent of men aged 10 years and above are employed compared to only 28 percent of females. Women are less likely than men to be self-employed or employers, as men hold most jobs in both the private and public sectors. While women in decision-

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6 Demographic Health Survey (2010), p.228
7 Demographic Health Survey (2010), p. 233
11 Timor-Leste Census Report-2010
making positions had a comparatively higher level of education than their male counterparts. Most of the unemployed were male (63%).

A general observation noted that of all women primarily economically inactive, more than one third (42%) were making some sort of economic contribution. Predominately in unpaid farming activities (29.5%) or through making tais (weaving), tablecloths, kurse or necklaces (7.1%). While Only 23 percent of inactive men were making an economic contribution, doing unpaid farming work (17.8%).

According to the 2010 Business Activity Survey, the private sector employs almost 47,000 people across the country, with nearly one third (30%) of those being women. The most profitable industry in the private sector is retail and wholesale trade, contributing more than USD108 million in added value to the economy in 2010. Women hold 38% of jobs in this industry and it employs 4,600 (33%) of the 13,900 women who work in the private sector. Construction is the next most profitable industry, where women hold 13% of jobs. The highest concentration of women in the private sector is in the accommodation, food and services industry, in which more than two thirds (68%) of employees are women.

- In case of access and control over the resources, including property and assets, women face serious economic constraints. The prevailing patriarchal norms, and customary law systems (commonly referred to as ‘lisan’ in Tetun), greatly influence the access to and control over resources, which tend to favour boys/men., and these norms translate further into rights to inheritance and property, or obtaining business finance, etc. This is despite provision in the 2011 Civil Code for women and men to enjoy equal rights to inheritance of land, as well as succession, customary law prevails.

The inheritance system continues to follow traditional matrilineal and patrilineal lines, especially in rural areas. In Timor-Leste, ‘matrilineal’ communities do not exceed 12.5% of the population. Even within the matrilineal community, mostly traditional patriarchal asset control prevails, with all assets (land, house etc.) belonging to a husband, and being inherited by male descendants only.

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12 Timor-Leste Census Report-2010
14 ibid.
15 ibid.
16 Land tenure, in Timor-Leste is extremely complex and compounded by the fact that it does not have precise information on landownership and agricultural land use. The landownership and titling is a major issue in the country with its long history of transformation. Historical events such as independence in 1999, wherein most of land was occupied without official title deeds, conflicts in 2006, have pushed people to remote and unsuitable land (steep slopes), which is a critical factor that influences the social vulnerability of the communities; see World Bank. 2015. Building Climate and Disaster Resilience in Communities along Dili-Ainaro and Linked Road Corridors Project. Component 1: Natural Hazard Risk Assessment. Synthesis Report
18 Narciso et al. (2012). “Land and Gender in Matrilineal Timor-Leste”
Furthermore, as stated in Social Institutions and Gender Index (SIGI); while there are no reported legal restrictions on women’s access to financial services, including credit, women have virtually no access to it. Moreover, Women often need references, husband’s signature or face difficulties filling out the forms due to illiteracy and, as such, experience barriers in applying for loans.\(^\text{19}\)

- The gender (in)equality scenario and gender dynamics is similar in the case of climate change and disaster risk realm. Climate change and disaster risks have been found to have differential impact on men and women, mainly emanating from differences in the gender-based roles. The magnitude of the impact is usually a factor of level of vulnerability of the communities in addition to the level of dependence on the natural system for livelihood. Women, in general, face different levels of risk and have different vulnerabilities and coping capacities resulting from gender-based political, cultural and socioeconomic differences and inequalities that persist throughout the world. Irrespective of gender, the causal effect of climate change and disaster risks is expected to increase proportionally with the level of human development, coping mechanisms and policy instruments that contribute towards creation of enabling environment. In the case of countries like Timor Leste where the staple source of household income is still agriculture-based activities, where sustenance farming prevails extensively and where rural infrastructures are either non-existent or need major overhaul, the lives of rural communities, especially women and girls are more sensitive to climate change and disaster risks.

In rural Timor-Leste, the burden of agricultural work, coffee harvesting and caring for home gardens is generally shared between men and women. However, domestic responsibilities such as child-rearing, cooking, cleaning and overall family wellbeing, reflects traditional gender roles. This implies that women’s vulnerabilities to climate change and disaster, while similar to men, include specific additional concerns such as:

- Access to water and firewood;
- destruction of and damage to the home gardens;
- damage to seeds;
- hindered access to markets and hence sale of products/ generation of cash;
- diseases and access to clinics; and
- closing of schools.
- Post-disaster health care

Due to the social and family roles of women, the lack of access to water is a critical limitation imposed on women by climate change. Women have to spend on average 2-3 hours a day on fetching water either directly from the source or from the nearest communal tap. Therefore, securing water for household and farming purposes

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through climate resilient water supply systems will bring considerable opportunities for improving women’s daily lives, health and livelihood. The need and priority of this intervention has been verified during consultations, interviews and community meetings with all women groups.

In general, male-headed households have higher incomes than female-headed households and overall there is a considerable difference in the income of male-headed households, which emphasises the increased vulnerability of female-headed households. Pregnant and nursing mothers are particularly vulnerable because of their increased need for food and water and their decreased mobility. As the primary caretakers of their homes, women tend to the needs of children, elderly and the disabled. This increases their workload and reduces their mobility in cases where quick evacuations are required or where they live a long distance to water supply facilities. It is known that the consequences for the balance between productive and reproductive activities of women is severely altered during and after flood event and has impacts on the resilience and income of a household.

- **Education** in Timor-Leste has succeeded in achieving gender-parity in primary and secondary school with girls’ rate exceeding boys: in 2010, 94% of primary school age girls and 92% of boys were enrolled in school. Net enrolments in presecondary school were 34% for girls and 27% for boys.20 Thus in Timor-Leste, the difference between females and males’ education in terms of numbers is not significant; but the largest gender gap in education attendance is at tertiary level with almost 60 percent of university and polytechnic/diploma students being male.21

As for **fields of study at tertiary institutions**, most women get their qualifications in areas such as economics and management (54% of graduates in 2010 were women) or teaching (41%). In 2010, fewer women graduated from the fields of engineering (21% of graduates were women), law (29%), public administration (31%), and agriculture (38%). While there has been an increase in the proportion of women studying economics and public administration, whereas their representation has fallen in law and agriculture.22

**Whereas** female literacy has risen from 43 per cent in 2007 to 70 per cent now but this is still below the 80 per cent literacy rate for males.23 In Timor-Leste, especially in the rural areas, a reason attributed to the high drop-out rate among female students is attributed to ‘the great distances between home and schools serve as an obstacle for female students, especially those who live in rural areas. Parents do not normally allow their daughters to travel too far from their homes, as girls are thought to be

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vulnerable’. Early marriage could be a factor for the high drop-out rates as also other consequences including participation in productive activities, and health. Wide disparities in education results in different abilities for women and men to acquire and process information and to communicate in face of disasters as well as to CCA measures.

- **Early marriage and reproductive health** - early marriage continues to take place in Timor-Leste, mainly in cases where a marriage has been arranged at birth or because of extreme poverty where ‘barlake’ (bride-price) can be agreed. As per the United Nations reports, (based on 2009 data), 8.1% of girls between 15 and 19 years of age were married, divorced or widowed (down from 10.6% in 2003); compared to 0.4% of boys in the same age range (down from 0.6% in 2003). Traditional attitudes and limited economic opportunities encourage women to marry and begin childbearing at a relatively young age, leading to high fertility rates. In terms of **reproductive health** high fertility, limited access to health services, safe water, and improved sanitation facilities increase the risk of maternal and child mortality. Although showing a declining trend, maternal (decreased from 660 per 100,000 live births in 2003 to 557 in 2009-2010, is the highest in the world) and child mortality (decreased from 60 deaths per 1,000 live births in 2003 to 45 in 2009–2010,) are key issues for women, and have been identified as the top public health priorities by the Ministry of Health (MoH).

- **Decision making** - Timorese women face significant inequality as compared to men in respect to **decision making** and restricted both at private and public sphere. Women’s participation in the decision-making process is limited by time constraints, gender stereo-types and patriarchal attitudes. In daily life, cultural norms in Timor-Leste assign the dominant role to men (patriarchal system) in planning or decision-making, with tradition and customary law favouring men over women. Men as head of the household make decisions especially those having economic implications while women about their health & minor purchase; senior women hold a higher status than other women. Thus, in households all major decisions pertaining to economic decisions are made by men.

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24 USAID. 2014. Patriarchal Barriers to Women’s Political Participation in South-East Asia: Lessons from the Philippines, Cambodia, Malaysia, Indonesia, and Timor-Leste on Patriarchy and the Rise of Women’s Participation in State Politics. P. 13


28 Ibid

29 Timor-Leste Population and Housing Census 2010; Analytical Report on Gender Dimension. Volume 4. Note- the data on education and work employment is also from this source

Similarly, the public sphere too is dominated by males with limited participation of women in decision making process (Details in Chapter -III under Women’s participation and Leadership).

The common barriers for women to enter leadership position in Timor-Leste include:

- lower education and literacy compared to men;
- discrimination in recruitment;
- negative stereotypes and attitudes towards women’s participation in public life;
- attitudes to women’s traditional role in the home;
- little support from families and political parties, especially little support for women to engage in politics as independent candidates without political party support;
- decision making;
- low solidarity between women;
- low civic awareness, and low confidence to put themselves forward as candidates.

- Agriculture: Over 80% of Timor-Leste’s rural population depends on agriculture and natural resources for their livelihoods. The geographic characteristics of Timor-Leste make it less than ideal for agricultural production with rugged, erosion-prone terrain, poor soils, and varying, often unpredictable rainfall. With more than 90% of the agriculture systems in rural areas are rain-fed, and is currently shaped by a predominance of small subsistence farms with low levels of production and productivity.

Households rely heavily on the cultivation of staple crops such as maize, rice, cassava, and sweet potato; Crop yields are well below the average for East Asia, leading to problems of food security in many communities, especially during the country’s dry seasons as other sources of income are limited and irrigated areas are lower. As reported in a study, poorer households are more vulnerable to increased food insecurity because their livelihoods are more reliant on a staple food crop that is sensitive to climate hazards, such as maize production for food and income than other households. This clearly demonstrates a linkage between poverty and vulnerability to climate change.

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32 Care. 2015, Food, water, rain, risk: the uphill struggle to adapt. Final evaluation of the MAKA’AS project on community-based adaptation in Timor-Leste p. 1
34 Care. 2015, Food, water, rain, risk: the uphill struggle to adapt. Final evaluation of the MAKA’AS project on community-based adaptation in Timor-Leste p. 1
37 Care International. (nd). Livelihood security in a changing climate
Key challenges include a lack of road and power infrastructure to get produce to markets, as well as limited access to finance and skills to develop more commercial operations. Mobility through stable and passable local roads and bridges not only reduces the risk of casualties during extreme climate events, but also directly contributes to increased livelihood opportunities. Climate resilient roads are also of high significance for both women and men, particularly those in disadvantaged and remote communities.

III. MECHANISMS TO ADDRESS GENDER INEQUALITY IN TIMOR-LESTE - LEGAL AND ADMINISTRATIVE FRAMEWORK

The government of Timor-Leste’s consistent political commitment to gender equality is demonstrated through the priorities given to the gender equality and gender inclusion at political and programmatic levels. The gender equality priorities are enshrined in the constitution as well. Article 17 of the Constitution, calls for equality between sexes in all areas of family, political, economic, social, and cultural life, while Article 16, calls for nondiscrimination on various grounds, including gender. 39 The government also adopted formal strategies to advance gender equity, namely:

- Gender mainstreaming is mandatory across all government laws, policies, programmes, processes and budgets, at the national as well as local level;
- Policies and frameworks to be developed to empower women socially and economically through various livelihood support measures;
- Basic services to protect women from risks to be improved;
- Mechanisms to provide financial support to women leading households strengthened;
- Education programmes will be introduced to promote the retention of girls at higher levels, particularly at the secondary and tertiary levels;
- More women to be employed across the civil service, also in senior positions;
- Policies, training and leadership programmes to be developed to support women in taking on decision-making roles in the public and private sectors;
- In addition, national zero-tolerance policy for violence in schools and homes will be introduced.

The government’s commitment is also reflected in Timor-Leste Strategic Development Plan (SDP) 2011–2030. The SDP acknowledges women’s contribution to the country’s communities, farming-sector, economy and homes, despite lacking in proper recognition and without adequate support. In addition to ambitious agenda for the nation’s future, with emphasis on social capital, infrastructure development, and economic development, focuses on achieving gender equality goals through the adoption of the following strategies: 40

Some of the national gender considerations are influenced by the international commitments that Timor-Leste has made in a capacity of a signatory or party to international conventions and protocols.

The internationally agreed Hyogo Framework for Action (HFA 2005-2015) makes special references to the following as priorities and general considerations 41: "A gender perspective should be integrated into all disaster risk management policies, plans and decision-making processes, including those related to risk assessment, early warning, information

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39 Constitution of the Democratic republic of Timor-Leste. Part II, Fundamental Rights, Duties, Freedom and Guarantees. Title I General Principles- section 16 (Universality and Equality); Section 17 (Equality between women and men)
management and education and training." Similarly, the guiding principles of Sendai Framework for Disaster Risk Reduction (2015–2030) that has superseded HFA, states that “A gender, age, disability and cultural perspective should be integrated in all policies and practices, and women and youth leadership should be promoted”42

More generally, the UN system has taken action toward achieving gender equality, such as by adopting the Convention on the Elimination of All Forms of Discrimination (CEDAW) against Women in 1979 and the Beijing Platform for Action in 1995 at the Fourth World Conference on Women in Beijing, which established gender mainstreaming as a global strategy for the promotion of gender equality.43

The Incheon Declaration on Disaster Risk Reduction in Asia and the Pacific 201044 recognizes the need to protect women, children and other vulnerable groups from the disproportionate impacts of disaster and to empower them to promote resiliency within their communities and workplaces; Thus gender serves as an important dimension of both vulnerability and adaptation, that is, whether and how women, men, boys, and girls from all minority, marginalized and diverse groups are affected by and respond to climate change and disasters.45

As a party to the UN Framework Convention on Climate Change (UNFCCC) and ratifying Paris Agreement, Timor-Leste has recognized the importance of involving women and men equally in UNFCCC processes and in the development and implementation of national climate policies that are gender-responsive by establishing a dedicated agenda item under the Convention addressing issues of gender and climate change and by including overarching text in the Paris Agreement46 and the two goals included are:47

- Improving gender balance and increasing the participation of women in all UNFCCC processes, including in delegations and in bodies constituted under the Convention and its Kyoto Protocol, and;
- Increasing awareness and support for the development and effective implementation of gender-responsive climate policy at the regional, national and local levels.

Under the Lima work programme on gender, parties agreed to review progress towards achieving these two goals in 2016 at COP 22 in Marrakech.48

42 Sendai Framework for Disaster Risk Reduction 2015 – 2030. Guiding principles -d
44 The Heads of Governments, the Ministers, and the Heads of Delegations of the countries of Asia and the Pacific, attending the Fourth Asian Ministerial Conference on Disaster Risk Reduction (AMCDRR) in Incheon, Republic of Korea, on 25–28 October 2010;
47 The twenty-first session of the Conference of the Parties (COP) and the eleventh session of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP) took place from 30 November to 11 December 2015, in Paris, France. http://unfccc.int/meetings/paris_nov_2015/session/9057/php/view/decisions.php ; accessed on 17th January 2017
48 UNFCCC. Gender and Climate Change - Intergovernmental Process. accessed on 17th January 2017https://unfccc.int/gender_and_climate_change/items/9619.php;
Though the gender equality is enshrined in the Constitution and given adequate consideration in the SDP, gender disparity and need for a better social inclusion is felt across the sectors. One of the fundamental causes of gender disparity is gender stereotypes. Existing gender stereotypes in the Timorese society limit livelihood & income generating opportunities, including developing skills in non-traditional areas, access to productive resources for women and men (girls and boys). Men, for example were more concentrated in occupations such as protective service workers, builders and car, taxi and van drivers. While women were more often working as housekeepers, weavers and gardeners. Gender stereotypes are also reflected in the types and levels of work that men and women take and the trainings that women and men receive in the technical and vocational education and training (TVET) Programmes, which in turn channels women and men into different jobs.

**Institutions:** In Timor-Leste, the Secretary of State for the Promotion of Equality (SEPI) was established as an institution and legal agency and a central Government body with the objective of strengthening women’s rights and gender equality. Now known as Secretary of State for the Support and Socio-Economic Promotion of Women (SEM), is the overarching national machinery for gender equality. SEM is to provide technical support and coordinate government efforts to gender equality across all sectors, as well as to monitor the implementation of the commitments. SEM also coordinates with the Gender Working Groups (GWGs) to ensure effective collaboration and integration of gender mainstreaming in government activities. The GWGs mechanism is implemented both at the national and municipality levels, is to ensure increased inclusion of gender priorities in Ministerial Annual Action Plans and budgets.

The SEM and the GWGs have the basic competencies on general gender issues, but require technical support to integrate gender in project implementation. have the following shortcomings:

- Lack of technical capacity to mainstream gender specific to CCA and DRR agenda or related projects. This is especially in the use of gender analysis tools, in combination with climate vulnerability risk assessment and providing policy support to projects pertaining to gender mainstreaming in CCA and DRR initiatives;
- Lack of influence within their respective institutions. Whilst not being consulted on project design, planning or in implementation of projects.

So far SEM’s, support to CCA and DRR related work has been limited. Similarly, the GWGs in each ministry has not been instrumental in gender mainstreaming because of their weak technical capacity specifically on gender related CC and DRR work.

49 Timor-Leste Population and Housing Census 2010; Analytical Report on Gender Dimension. Volume 4. Note- the data on education and work employment is also from this source
Consultations for this assessment also showed gender capacity gaps in institutions, such as Institute of Public Administration (INAP) who have a responsibility for training civil servants lack technical capacity on gender, and gender is not included in their curriculum. Moreover, courses on CCA and DRR which is being developed, should look to providing specific content on gender, CC and DRM/DRR as a separate course and integrated into other courses as well. The findings underscore that the main actors in e Timor-Leste’s institutional framework for gender equality, needs capacity strengthening, especially on gender work related to climate change and disaster risks.

### Measures and Instruments to Promote Gender Equality, Women’s and Youth’s Empowerment

<table>
<thead>
<tr>
<th>No.</th>
<th>Measure</th>
</tr>
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<tbody>
<tr>
<td>1.</td>
<td>Ratification of the UN Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) and its accompanying Optional Protocol without reservation (16 April 2003);</td>
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<tr>
<td>2.</td>
<td>Adoption of the Millennium Development Goals;</td>
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<tr>
<td>3.</td>
<td>Establishment of the Office of the Advisor to the Prime Minister for the Promotion of Gender Equality (2002) which was then replaced by the Secretary of State for the Promotion of Equality (2007);</td>
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<td>4.</td>
<td>Establishment of Secretary of State for the Promotion of Equality in 2007 through (Decree Law No.16/2008 of 4 June)</td>
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<td>5.</td>
<td>Establishment of Gender Focal Points in all 13 Districts^54</td>
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<td>6.</td>
<td>The adoption of the National Youth Policy by the Council of Ministers in 2007</td>
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<td>7.</td>
<td>Establishment of a Gender Affairs Unit and a Vulnerable Persons’ Unit (VPUs) in the National Police at the national and district levels;</td>
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<td>8.</td>
<td>Adoption of Dili Declaration (&quot;Dili Komprimisu&quot;) by the National Parliament, Government and civil Society during the celebration of International Women’s Day 2008 (March 2008) as an acknowledgement and a political commitment to gender equality and investing in women and girls, to achieve sustainable development, address poverty and strengthen society.</td>
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<td>9.</td>
<td>Establishment and integration of a parliamentary Gender Resource Centre as a formal organisational structure of the National Parliament under the new Parliamentary Law (15/2008, December 2008);</td>
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<td>10.</td>
<td>Integration of a gender-responsive budgeting statement into the National Budget (since 2008);</td>
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<td>11.</td>
<td>Establishment of Timor-Leste Youth Parliament;</td>
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<td>12.</td>
<td>Submission of Timor-Leste first CEDAW compliance report (July 2009), for the first time in history, as part of their commitment to and accountability for gender equality and women’s empowerment in the country;</td>
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<tr>
<td>13.</td>
<td>Adoption of Parliamentary Resolution on Gender-Responsive Budgeting (14 July 2009)</td>
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<td>14.</td>
<td>Adoption of a Law against Domestic Violence in 2010;</td>
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<td>15.</td>
<td>The formulation of a Working Group to draft the National Action Plan on Gender-based Violence (2011);</td>
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<tr>
<td>16.</td>
<td>Adoption of the National Action Plan on Gender-Based Violence by the Council of Ministers (29 May 2012);</td>
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<td>17.</td>
<td>Adoption of SEPI Five Years Strategic Plan 2010-2015;</td>
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<td>18.</td>
<td>Implementation of the UN Security Council Resolution 1325 on Women, Peace and Security, such as through a Trilateral Conference and Cross-Learning session with Liberia and Ireland (2009-2010);</td>
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<td>19.</td>
<td>Establishment of the National Gender Working Group in all ministry/Secretary of State at the national and district level (2012);</td>
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^53 SEPI was established by the Fourth Constitutional Government of Timor-Leste to replace its predecessor: The Office the Advisor on the Promotion of Gender Equality to strengthen Timor-Leste’s commitment to gender equality and women’s empowerment. SEPI is the government’s main body responsible for the design, execution, coordination, and assessment of policies related to gender equality.

^54 The Gender Focal Points structure has been replaced by the National Gender Working Group since 2012 through Council of Ministers Resolution 27/2011
20. Integration and implementation of a gender mainstreaming strategy into various programmes within the ministries and Secretaries of State;

21. Integration of a gender perspective into the Electoral Law at the national and Suco levels;

22. Inclusion of women’s and youth’s representation in Suco Council;

23. Increase of women’s quota in the candidate lists for the Parliamentary Election from at least one in every four (4) candidates on the party list must be a woman (Electoral Law 2006) to one in every three (3) candidates on the party list must be a woman (Amendment to Electoral Law 2006 in June 2011);

25. Inclusion of a gender perspective into Timor-Leste Strategic Development Plan (SDP) 2011-2030;


Source: GIZ. Gender Analysis- “Building Peace by Improving the Employability and Income Opportunities of Marginalized Groups” Timor-Leste. pp. 8-10

Administration Framework

Timor-Leste has recently endorsed Decentralization Decree Law, which has strengthened and empowered sub-national administration units, mainly municipal authorities, municipal administrations, administration posts, sucos (villages) and aldeias (sub-village). With the additional authority and decision-making power, the sub-national administration units have a bigger role to play in engendering development process.

Hence, in addition to the national level, government authorities at municipal and suco levels are best placed to provide the necessary support for a gender responsive resilience-building agenda that has communities at its centre. There are two existing mechanism, namely, (i) Municipality Integrated Development Plan (PDIM) or Plano Desenvolvement Integrado Municipal, and (ii) National Programme for Village Development or Programa PNDS (nasional Desenvolvimentu Suku).

The PDIM process

PDIM is one of the Government programme implemented throughout the country aimed at harmonizing the implementation of programmes conducted at the district level. The most notable change in terms of climate impacts and disaster risk reduction that PDIM will be faced with is the need to increasingly address the underlying causes of vulnerabilities in face of climate change and disaster risk. This is fundamentally relevant for gender issues, which link the vulnerabilities seen in climate adaptation and disaster response with the vulnerabilities that present challenges in development.

The PDIM has a planning mechanism integrated in its organisational structure and process established and implemented starting from Aldeia to Suco, Administrative post and Municipality level; the numerous stakeholders involved are: (i) Community members (ii) Suco Councils (iii) territorial delegations (iv) Sub-district Development Commission (v) The Ministries responsible for local Administrations (vi) Line Ministries and (vii) The National Development Agency.
During the field visits, as well as KIIs held on mainstreaming gender in the PDIM process, government representatives in the municipalities visited underscored that the project proposal review process based along the line of its organisation structure ensures that gender is integrated. Figure 2 shows the graphic depiction of the perspective of gender integration in the PDIM process. There were others who argued that despite the appearance of participation of women in the proposal review process there are certain gaps:

- It was revealed during discussions that proposals submitted by women’s groups - mostly related to water and livelihoods - often get eliminated at the end of the process by the committee. Community members underscored the need to provide training to support woman on developing good proposals, based on sound planning including identifying their need;
- There are no provisions and guidance on how females’ and males’ needs and concerns are taken into consideration in project design, planning and implementation and tracking impact;
- Allocation of budgets.

**Figure 1 Perspective of perceived gender integration in the PDIM process**

**PNDS process**

The PNDS is a new, nation-wide community development programme of the Government of Timor-Leste. The PNDS channel funds directly from the Government to communities which will plan, construct and manage small-scale infrastructure projects in their sucos (villages). The types of infrastructure to be built or refurbished includes irrigation canals, local bridges, motorcycle paths, market places, kindergartens and sports facilities, water supplies, schools and health posts.

It was expressed that PNDS has more focus on gender from planning to implementation. Women from the village council submit proposals that are based on community discussion; although there is no specific fund for proposals from women’s groups. Generally, proposals from women groups are mostly related to water supply and livelihoods- such as agroforestry (for coffee, fruits and fuelwood), raising poultries, producing “tais”, setting up kiosks, and etc.
As such, these priorities expressed by women gorups have been fully affirmed and embedded into the GCF funding proposal.
IV. GENDER ISSUES IN RESPONSE TO IMMEDIATE CLIMATE INDUCED DISASTERS AND CLIMATE RISKS

In Timor-Leste, rural populations are greatly exposed to a range of hazards, including flash floods, landslides, soil erosion, coastal flooding and drought due to unfavourable terrain, socio-economic factors and intensification of these climate-induced hazards over time. Disasters, related risks and vulnerabilities have social as well as physical dimensions. Climate change and disaster risks have been found to have differential impact on men and women, mainly emanating from differences in the gender-based roles. The magnitude of the impact is usually a factor of level of vulnerability of the communities and the level of dependence on the natural system for livelihood. The impact of disasters and related risks are different for women and men. Shaped by gender roles and relations this is reflected in their differential capacity to respond to disaster. Gender inequality and women’s disempowerment are the determining factors behind women and girls being disproportionately affected by climate change and disasters; and at the same time their ‘skills and life experiences are not identified as resources, and, therefore, are not incorporated into risk reduction and disaster preparedness, relief or recovery efforts’. Unless these inequalities are adequately assessed and incorporated into climate change adaptation and DRR measures, the disparities are likely to be exacerbated.

Irrespective of gender, the causal effect of climate change and disaster risks is expected to increase proportionally with the level of human development, coping mechanisms and policy instruments that contribute towards creation of enabling environment. In the case of countries like Timor Leste where the staple source of household income is still agriculture-based activities, where sustenance farming prevails extensively and where rural infrastructures are either non-existent or need major overhaul, the lives of rural communities, especially women and girls are more sensitive to climate change and disaster risks.\textsuperscript{55}

As cited in a report ‘Gender serves as an important dimension of both vulnerability and adaptation, that is, whether and how women, men, boys, and girls are affected by and respond to climate change’.\textsuperscript{56} While vulnerability ‘is commonly understood as social, economic, political, cultural, or other factors which make specific groups more susceptible to adverse change’.\textsuperscript{57} Adaptation is understood as ‘the ability to change in response to the impacts of an event to minimize adverse consequences.’\textsuperscript{58}

There has been considerable evidence that attention to gender in disaster planning and recovery is essential, but limited attention paid to disasters and family violence; worldwide literature suggests that increased violence against women is characteristic of post-disaster

\textsuperscript{55} Term of Reference for this consultancy under the heading “Background”


\textsuperscript{57} Ibid. P.4

\textsuperscript{58} Ibid. P.4
recovery. Gender-based violence is found to increase due to disaster-induced stress and the temporary breakdown of law and order. Of the little available research on the gender implications of climate-change and disaster related impacts, it was found that it can exacerbate existing inequalities and create new vulnerabilities as well as leading to increased gender-based violence; for instance there are increased risk of assault and violence for women and girls having to travel further to access water sources/fuels; or because of migration and community destabilization in areas affected by climate change – there are increased incidences of harassment, sexual abuse and domestic violence during the migratory cycle etc. Furthermore, post-disaster recovery and mobility is also impeded due to impassable roads and damaged bridges. As women mainly stay home occupied with their household chores and home-gardening, they and their children mostly remain isolated after extreme climate events or disasters. This creates a high level of risk to the lives and health of women and children.

For effective mainstreaming of gender considerations into Climate Change projects it is important to have gender-focused approach (instead of a woman focused approach) so that gender relations in CCA and in DRR be analyzed within a socio-economic and cultural context of Timor-Leste. Designing or redesigning interventions on an understanding as to what the norms and expectations are for women and men and how this might affect the projects, will enable to achieve long term sustainable outcomes. Therefore, in addition to water supply infrastructure and livelihoods (through agroforestry interventions), the project also addresses the issue of mobility via installing climate-proofed and stabilized roads and bridges.

These issues were discussed and identified during the FGDs and community dialogues consultation. Most women in the municipalities visited for this assessment, are engaged in agriculture. In general, women spend more time performing household chores than men during both the dry and rainy seasons, harvesting/sowing of crops. While both women and men are engaged in agricultural activities, because of additional reproductive and care works, women have less time for leisure, unlike men who may have more time for socialization and relaxation during the day. All the municipalities reported that reproductive roles such as cooking, washing, fetching water and firewood were regarded as women’s roles. Though not obligated, men and children (boys and girls) help in fetching water and firewood. Men, for example help if the source of water is too far away, in such instances women will stand in the queue and men help to bring the water home.

To underscore the importance of developing and implementing gender responsive climate resilience programmes and projects in addition to ascertaining that gender is effectively mainstreamed into the climate resilient development, Timor-Leste drafted two related policies; National Climate Change Policy and National Disaster Risk Management Policy.

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61 Ibid. Pp. 146, 148
Gender dimensions forms an integral part of these policies and also one of the guiding principles guiding implementation of these policies. Though both these policies are pending approval from the Council of Ministers, considering that these policies were drafted in highly consultative and inclusive manner.
V. GENDER ANALYSIS AND RECOMMENDATIONS

The gender analysis undertaken at the onset and design of this project acts as an entry point for gender mainstreaming throughout implementation. Stakeholder consultations took place in May 2017. Results from the consultations are detailed in the Stakeholder Engagement Report and Stakeholder Action Plan annex included in full as an additional annex as part of the proposal.

The gender analysis, through stakeholder engagement and consultation considered the following:

- Ensuring men’s and women’s equal participation in its activities under projects components;
- Identifying the socio-economic, cultural and institutional barriers that deterred women’s and men’s equal participation and their ability to equally benefit from its activities;
- Identifying the differences in men’s and women’s ability to access and control the benefits derived from its activities;
- Assessing the impacts of the project on women’s empowerment and well-being through the collection of high quality sex-disaggregated data.

The consultations have identified the following areas as particularly important dimensions to be reflected in the implementation strategy of the project:

- Tremendous improvements in increasing women’s active participation in the decision making, particularly during the PDIM and PNDS formulation process to ensure that climate responsive infrastructures are gender response too;
- Gender analysis must be included as part of risk and vulnerability assessments, for the national and local governments to effectively collect sex and age disaggregated data.
- Implementation of the Capacity Enhancement Strategy for Gender Mainstreaming in CC and DRR developed as part of this assessment;
- Relevant analytical tools and frameworks must be simplified and made available in Tetun/other local languages;
- Systematic capacity building and empowerment of the Gender Focal Points appointed by the government in each line ministry. In order to enable them to contribute in mainstreaming climate responsive gender priorities into sectoral plans and programmes;
- Critical to improve evidence informed knowledge generation, requires support in developing tools (or strengthening existing ones), procedures and capacity for systematic sex-age disaggregated data collection, analysis and storing on climate change and disaster impacts, capabilities and other relevant information;
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• The assessment tools, mainly the vulnerability assessment tools and primary data collection methodology needs to improve and strengthen areas that has the potential to raise awareness and knowledge amongst CC and DRR practitioners supported by trainings and technical assistance;

• The existing knowledge platform could also be used to share information, knowledge and experience in addressing gender issues;

• Develop context specific conceptual policy guidelines on gender, CCA and DRR for national and local governments to bring more clarity on gender issues in development, CCA and DRR gendered-based analysis of access to resources. All which can be reflected in the engagement of women and youth in project activities;

• Encourage implementation of Gender Action Plan and make conscious effort to generate gender responsive results;

• Developing knowledge products and advocacy material which specifically mention about the benefits, mechanisms and process for systematic and consistent gender mainstreaming into climate responsive development interventions;

• Support capacity building of elected women representatives, male representatives and leaders, and female community leader. Civil society working on gender including women’s groups whilst networking on gender related CCA and DRR to ensure it is actively engaged in planning and monitoring at the municipal level.

• Introduce accountability mechanisms and specific progress monitoring indicators for all the stakeholders;

• Foster the creation of women’s groups that contribute to diversifying local and specifically women’s livelihoods to increase their resilience. Strengthen women’s access to the following livelihood dimensions:\n
  o Social capital: Create and strengthen local women’s networks and groups, as well as representation in local institutions;
  o Economic capital: Promote women’s livelihoods through securing access to water, irrigation, and agricultural production;
  o Human capital: promote formal and non-formal education measures targeted to increase the employability of women, both self-employment and salaried employment (through training and incentivising women-led companies, or companies that employ women and apply gender parity as employment policy);
  o Physical capital: promote safe communication and transportation for women and equal access to information. Climate resilient roads and bridges improve mobility of women and their access to local markets and escape routes during and after the extreme climate events and disasters;
  o Natural capital: Promote stability of communal land for increasing overall climate resilience and land productivity.

62 For details see DFID, 1999, Sustainable livelihoods guidance sheets
During project implementation, qualitative assessments will be conducted on the gender-specific benefits that can be directly associated to the project. This will be incorporated in the annual Project Implementation Report, Mid-Term Report, and Terminal Evaluation. Indicators to quantify the achievement of project objectives in relation to gender equality will include women and youth who had access to affordable solutions, number of women and youth employed from the jobs created by the project, training opportunities, knowledge management and information dissemination.
VI. GENDER ACTION PLAN

Programme level activities, inputs and baseline information have been used to develop gender action plan. The gender action plan presented below provides specific information on how the project will ensure that gender dimension is well integrated into the proposed activities.

<table>
<thead>
<tr>
<th>Activities</th>
<th>Description</th>
<th>Gender mainstreaming action</th>
<th>Target and Indicators</th>
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<tr>
<td>1.1. Climate risk knowledge base developed and climate information services developed and delivered to all sectoral institutions</td>
<td>Surveys, data analysis, modelling, production of hazard, risk and vulnerability mapping. Purchase of software hazard, risk and vulnerability modelling and mapping Undertake hazard, modelling and mapping Undertake risk and vulnerability modelling and mapping</td>
<td>1.1.1 Develop and codify methods and tools for undertaking gender-sensitive socio-economic surveys to fully map the socio-economic conditions of the rural poor in TL to mainstream gender into DRR. 1.1.2 Undertake socio-economic risk and vulnerability assessment to fully map existing vulnerability within TL using new gender mainstreaming survey techniques which provides a comprehensive analysis of differential impact of climate risks on male and female. 1.1.3 Develop a built-in checking mechanism into the survey methodology to enable the surveyors to monitor the desired level of gender integration during the survey</td>
<td>I 1.1.1 Number of methods and tools for collecting gender-disaggregated socio-economic data and gender-disaggregated hazard perception T 1.1.1 At least two tools (e.g., questionnaires, gender specific consultation meetings) implemented I 1.1.2 Number of reports on gender responsive vulnerability surveys using gender mainstreaming tools T 1.1.2 Report on gender-specific vulnerability to mainstreaming I 1.1.3 Ratio of women in stakeholder consultations on floodplain zoning T 1.1.3 At least 30% participants of consultations are women (against 14% of baseline value)</td>
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<td>1.1.4 Integrate gender disaggregated and gender-vulnerability data into the hazard, risk and vulnerability modelling to ensure that the sex-disaggregated information is captured and transmitted for gender responsive decision-making process. 1.1.5 Enable gender-disaggregated vulnerability output analysis and reporting in the hazard, risk and vulnerability modelling to enable ready availability of gender-specific data on hazard, risk and vulnerability 1.1.6 Mandatory provision of including at least 20% relevant female staff when training in hazard, risk and vulnerability modelling will be provided at national and local government level to MSS staff</td>
<td>I 1.1.4 GIS-based socio-economic risk and vulnerability model data input include gender data T 1.1.4 All relevant gender-disaggregated data and gender parameters as primary input data to model I 1.1.5 Number of gender-disaggregated hazard, risk and vulnerability model reports T 1.1.5 Pro-forma for hazard, risk, vulnerability and CBA reporting for baseline, progress and final report on social and gender vulnerability I 1.1.6 Ratio of women in stakeholder consultations on floodplain zoning T 1.1.6 At least 30% participants of consultations are women (against 14% of baseline value)</td>
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<td></td>
<td>1.1.7 Develop and introduce a gender responsive GIS-based tool to integrate various spatial socio-economic data with the hazard</td>
<td>I 1.1.7 Number of gender-responsive risk management tool</td>
</tr>
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</table>
1.1.8 Provide training in new tools and methods for risk and vulnerability modelling and CBA.

1.2.1 Develop gender responsive monitoring and evaluation framework and data collection systems to systematically document differential losses and damages on male and female provided all other underlying causal parameters remain same.

1.3.1 Develop Gender Responsive Climate Change Strategy and Action Plan which encompasses the priorities endorsed in the national documents as indicated in the upcoming National Climate Change Policy.

1.3.2 Review and improve all standards, guidelines and specifications for rural infrastructure, encompassing both technical and functional standards to respond to climate risk reduction requirements and make gender responsive, based on international best practices.

1.3.3 Input to the development of the Rural Roads Master Plan & Investment Strategy 2016–2020 to help embed gender responsive climate resilience measures into road master planning.

1.3.4 Input to the development of a National Water Supply Policy and Strategic Plan to provide the medium to long-term vision for the sector and to provide a framework for the institutional arrangements, overall operation and management of DNSA and coordination with other sectoral agencies and partners, to ensure that gender responsive climate resilience approaches are embedded in the policy and strategy for water supply.

1.3.5 Develop guidelines and SOPs for all infrastructure investments to be carried out under the municipal (PDIM) and village (PNDS) development plans to make these plans climate and gender responsive.
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1.3.6 Develop a capacity building plan and roadmap for national and regional authorities to integrate new policies, plans and strategies and guidelines into PDIM and PNDS which are gender and climate responsive. This would include the development of tools that will be needed for implementation and enforcement of new methods and guidelines for CR infrastructure development planning and implementation.

| I 1.3.6 Gender considerations are reflected in PDIM and PNDS policy, planning and strategy documents and technical guidance | T 1.3.6 All PDIM and PNDS policy, planning and strategy documents include gender considerations |

1.3.7 Implement capacity building and training based on CDP for national and regional authorities.

| I 1.3.7 Decision makers and practitioners are trained on gender mainstreaming in DRR. | T 1.3.7 At least 50% beneficiaries are female would be strictly followed |

1.3.8 Support the National Institute for Public Administration (INAP) to implement gender responsive Disaster Risk Management Training Manual, which has recently been launched by Ministry of Social Solidarity and INAP.

| I 1.3.8 Gender mainstreaming in CCA and DRM training course material developed to support INAP | T 1.3.8 At least 1 gender-response training course developed |

2.1 Village and Municipal development plans (PDIM and PNDS) fully integrates climate change risk considerations into their annual planning and budgeting cycle for small scale rural infrastructure.

| 2.1.1 Develop step-by-step guidelines for climate risk reduction measures for all categories of small-scale rural infrastructure (water supply, road and bridges, irrigation, flood defenses) through PDIM manual – CAMP; Community-based management and maintenance – GMP manual, KAM – municipal procurement guidelines and administrative post and the Ministerial Technical Committee review checklists and ensure that these guidelines are gender responsive | I 2.1.1 Gender mainstreaming incorporated into CAMP, KAM and EVAS guidelines | T. 2.1.1 CAMP, KAM and EVAS guidelines gender responsive |

2.1.2 Strongly advocate to enhance the capacity of the female staff as and when possible during the trainings designed for the municipal level technical monitoring teams.

| T. 2.1.2 At least 30% of females undergo capacity development as part of municipal level technical monitoring teams (against 14% of baseline value) |

2.1.3 Liaise with the National University of Timor Lorosae (UNTL) and MSA and MoPTC to increase the intake and consequent capacity enhancement trainings for the female engineers and architects.

2.1.4 Conduct information campaign on linkages of gender and climate change and the benefits of using gender responsive tools in the development of PDIM and PNDS.

| T. 2.1.4 At least two trainings on differential impact of climate risks on male and female which accounts for gender dimensions in the climate responsive local level planning process. |

2.1.5 Design the trainings based on the findings of the differential impact of climate risks on male and female which accounts for gender dimensions in the climate responsive local level planning process.

| T. 2.1.5 At least two trainings on differential impact of climate risks on male and female which accounts for gender dimensions in the climate responsive local level planning process as part of gender mainstreaming campaign under PDIM and PNDS |

2.1.6 Provide trainings and develop a critical mass of national/local trainers on using gender responsive CC guidelines/tools involved in PDIM and PNDS planning process.

2.1.7 Customized technical assistance and support for the municipal, administrative post and suco level officials involved in PDIM and PNDS planning process to establish mechanisms and implement structural change that will help balance the representation of women and men in different...
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<td>roles and opportunity to share and contribute to the PDIM planning process.</td>
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<td>2.1.8 Engender Environmental impact assessment (EIA) process to account for the differential impact and consequent differential risk mitigation measures at the detailed design stage, in line with international good practice.</td>
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<td>2.2 Municipal finance made available for the design and deployment of climate resilient infrastructure at a scale that directly benefits 175,840 people, 15% of the country population.</td>
<td>2.2.1 Support the eligible women led contractors to build their capacity and make provisions to prioritize these eligible women led companies for the construction of 130 CR infrastructure projects.</td>
<td>2.2.2 Provision of prioritizing eligible contractors whose workforce includes at least 30% women.</td>
<td>T 2.2.1 At least 1 eligible women led contractors (against 0 at the baseline) engaged to build their capacity and make provisions to prioritize these eligible women led companies for the construction of 130 CR infrastructure projects and/or prioritization of eligible contractors whose workforce includes at least 30% women. T 2.2.2. Infrastructure units prioritized by women such as water supply and irrigation has been climate proofed in each target municipality.</td>
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<td>2.3 Supporting catchment management and rehabilitation measures to enhance climate resilient infrastructure and communities.</td>
<td>2.3.1 Support in establishing and consequently building capacity of women led community organizations and community nurseries to help in implementation of agro-forestry and reforestation activities for catchment management.</td>
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<td>T 2.3.1 At least 50% of female led households engaged in agro-forestry and afforestation schemes implemented by the project.</td>
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