

Annex 11b

Economic and Financial Analysis

to the GCF Funding Proposal

Climate-resilient landscapes in Central Asia

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Abbreviations and Acronyms

Acronym	Definition
AE	Accredited Entity
AFOLU	Agriculture, Forestry and Other Land Use
AR	Afforestation/Reforestation
BCR	Benefit-to-Cost Ratio
CAG	Conservation Agriculture
CAPEX	Capital Expenditure
CRLE	Climate-resilient and Low-emission
EIRR	Economic Internal Rate of Return
ENPV	Economic Net Present Value
EUR	Euro
FIRR	Financial Internal Rate of Return
FNPV	Financial Net Present Value
GCF	Green Climate Fund
GHG	Greenhouse Gas
GIZ	Deutsche Gesellschaft für internationale Zusammenarbeit GmbH
IPM	Integrated Pest Management
IRR	Internal Rate of Return
KG	Kyrgyz Republic
MSMEs	Micro, Small and Medium-sized Enterprises
NPV	Net Present Value
NTFP	Non-timber Forest Product
OPEX	Operational Expenditure
SPC	Shadow Price of Carbon
SSE	Super-Super Elite
tCO ₂ eq	Tonnes of Carbon Dioxide Equivalent
TA	Technical Assistance
TJ	Tajikistan
UZ	Uzbekistan

1. Executive Summary

1. The Climate-resilient Landscapes in Central Asia programme aims to support a shift towards climate-resilient and low-emission (CRLE) AFOLU systems across Central Asia and specifically in the Kyrgyz Republic (henceforth KG), Tajikistan (henceforth TJ), and Uzbekistan (henceforth UZ) through an integrated package of enabling measures, landscape-level investments, and regional cooperation. The programme has three interrelated components. Component 1 creates the enabling environment for change through climate-informed planning, stronger public finance readiness, and improved financial sector capacity for CRLE investments. Component 2 drives adoption and investment at landscape level in 180 municipalities across the three countries through subnational planning, restoration and sustainable management of forests and rangelands, and support for farmers and value chain actors to adopt CRLE practices and technologies. Component 3 strengthens regional cooperation through foresight, knowledge exchange, and financing arrangements for transboundary climate action. The programme has a total budget of EUR 264,375,370, including EUR 119,580,500 from the GCF in the form of a grant.
2. From a financial analysis perspective, the programme includes both non-revenue-generating and revenue-generating activities. Component 1 focuses on enabling conditions and does not generate direct financial returns. Under Component 2, the subnational planning activities under Output 2.1 and the forest and pasture restoration and management activities under Output 2.2 are expected to generate limited to no direct financial returns, even though they are essential for strengthening resilience, restoring ecosystems, and creating the conditions for sustained climate adaptation at landscape level. By contrast, the agricultural and value chain investments supported under Output 2.3 are expected to generate direct financial returns for beneficiaries through improved productivity, reduced climate risk, improved resource-use efficiency, and stronger market participation. The agricultural financial analysis distinguishes between representative smallholder/farmer group/cooperative investments, which reflect the programme's primary target beneficiaries, and commercially oriented models to illustrate the financing characteristics of larger commercially oriented investments to be served by the EIB intermediated loan programme. Component 3 focuses on regional cooperation, strategic foresight, knowledge exchange, and regional financing mechanisms, and therefore does not generate direct financial returns. Thus, the financial analysis focuses primarily on the revenue-generating interventions under Component 2, while recognising that a substantial share of the programme consists of public-good investments that are not expected to generate direct cash returns.
3. The financial analysis compares the programme scenario without GCF support and the programme scenario with GCF support. The purpose is to assess whether the proposed revenue generating AFOLU investments are financially viable for targeted beneficiaries, whether they would remain feasible without grant support, and to what extent differentiated GCF support improves investment affordability, reduces upfront financing barriers, and enables adoption by beneficiary groups that would otherwise face significant financing constraints. The analysis also considers debt-service capacity (DSCR) to distinguish investments that may appear financially attractive in discounted cash-flow terms but remain unaffordable under commercial lending conditions. Given limited access to affordable finance, low debt-bearing capacity, and the high perceived risk of CRLE investments, GCF grant support is critical to make the proposed investment packages feasible and scalable at beneficiary-level (including *leskhoz*es and pasture management organisations). The analysis further demonstrates that matching grants and concessional lending are complementary financing instruments serving different beneficiary groups: matching grants are targeted primarily at representative smallholders and farmer organisations facing severe financing constraints, whereas the EIB intermediated loan programme is intended for more commercially oriented actors with greater capacity to service debt.
4. The economic analysis takes a broader perspective and considers the overall economic returns of the programme beyond direct financial returns. In addition to the economic gains associated with revenue-generating activities, the analysis includes the carbon benefits to be accrued over the lifetime of the programme through avoided emissions and removals in the AFOLU sectors. Several important programme benefits are not monetised. In particular, due to methodological and valuation challenges, the economic analysis does not quantify the benefits associated with reduced degradation, avoided ecosystem deterioration, and enhanced biodiversity outcomes. Wider resilience and ecosystem-service benefits are also only partly captured. The resulting economic

indicators should therefore be considered conservative and are likely to underestimate the full value of the programme.

5. The economic analysis, including the GCF and co-financing, yields an ENPV of EUR 372.7 million, an EIRR of 14.6%, and a BCR of 1.35. The economic analysis of the GCF-supported contribution alone yields an ENPV of EUR 121.3 million, an EIRR of 12.6%, and a BCR of 1.19. The programme is economically justified and that both the overall programme investment and the GCF-supported contribution generate positive wider social and environmental value.
6. In addition to the benefits captured in the economic assessment, the programme is expected to generate important positive non-market effects. These include stronger climate-informed planning systems, improved capacities of public institutions and financial actors, more sustainable management and restoration of forests and pastures, improved adaptive capacity of rural populations, and stronger regional cooperation on transboundary climate risks. The programme is also expected to contribute to wider livelihood and employment benefits where agricultural and value chain investments increase labour demand and improve the viability of climate-resilient production systems. Since several of these benefits are difficult to monetise robustly, they are not fully captured in the economic model, meaning that the economic results are likely to understate the programme's full benefits.
7. The analysis shows that the programme is justified overall from both a financial and an economic perspective. It also shows why GCF support is necessary: to help make key beneficiary-level investments feasible and to finance enabling and regional activities that do not generate direct financial returns. The financial analysis highlights that commercial borrowing alone is frequently insufficient for target beneficiaries under GCF finance because of affordability constraints and limited debt-service capacity. By combining institutional strengthening, landscape restoration, support for productive agricultural investments, and regional cooperation, the programme is designed to deliver resilience, mitigation, and wider environmental and social benefits that go beyond those directly captured in the quantified financial and economic analysis.

2. Introduction

8. This note should be read in conjunction with the Excel model in Annex 11a. This document provides an overview of the results of the Economic and Financial Analysis that was conducted during the development of the feasibility study and funding proposal for the Climate-resilient Landscapes in Central Asia programme. The note presents a short overview of the programme scope and the activities relevant to the analysis, and then outlines the methodologies applied for the financial and economic analyses and summarises the key results. Model results can be accessed in the tab “*Project_results*”, sector specific results can be accessed in the tabs “*Result_past*” for pasture interventions, “*Result_forest*” for forest interventions, and “*Result_agr*” for agriculture interventions.

3. Programme scope

9. The Climate-resilient Landscapes in Central Asia programme supports a shift towards CRLE AFOLU sectors across Central Asia through an integrated package of enabling measures, landscape-level investments, and regional cooperation. The programme is structured around three mutually reinforcing components. Component 1 focuses on strengthening the enabling environment for CRLE development through climate-informed planning, stronger public finance readiness, and improved financial sector capacity for CRLE investments. Component 2 supports the adoption of CRLE practices and technologies at landscape level through subnational planning, restoration and sustainable management of forests and rangelands, and support for farmers and value chain actors to adopt climate-resilient and low-emission practices and technologies. Component 3 strengthens regional cooperation through foresight, knowledge exchange, and financing arrangements for transboundary climate action.
10. From the perspective of the Economic and Financial Analysis, the three outcomes have different implications. Component 1 focuses on enabling conditions and institutional strengthening and does not generate direct financial returns. This includes investments in climate-informed planning systems, public finance readiness, climate and carbon finance capacity, and improved financial sector readiness to assess and support CRLE investments. These activities are essential for addressing core barriers to climate-resilient AFOLU transformation, but their benefits are largely indirect and not materialise through direct beneficiary-level cash flows.
11. Component 2 contains both non-revenue-generating and revenue-generating activities. Under Output 2.1, the programme supports climate-informed AFOLU planning at the subnational level through diagnostics, prioritisation, and participatory planning. Under Output 2.2, the programme supports forest and rangeland restoration and sustainable management through management plans, technical assistance, and targeted restoration investments. These activities generate limited direct financial returns, even though they produce important resilience, restoration, and ecosystem-service benefits over time. By contrast, Output 2.3 supports the adoption of climate-resilient and low-emission practices and technologies in agriculture and along value chains through extension, technical assistance, and access to finance. These interventions generate direct financial returns. The beneficiary-level financial analysis thus focuses primarily on the revenue-generating interventions under Output 2.3, while also considering the limited direct returns associated with selected interventions under Output 2.2.¹ The analysis recognises that the programme as a whole includes a substantial share of public-good investments that do not generate direct financial returns.
12. Component 3 focuses on regional cooperation and likewise does not generate direct financial returns. Its activities strengthen strategic foresight, regional knowledge exchange, and financing arrangements for transboundary climate action. These interventions are expected to create value through improved coordination, stronger regional capacities, better access to shared knowledge resources, and more effective structuring of finance for cross-border adaptation priorities. As with Component 1, these benefits are real and important, but they are not captured through direct financial returns to programme beneficiaries. The broader programme effects are reflected only partly in the quantified economic analysis, which captures the programme’s mitigation benefits but does not fully monetise several other resilience, ecosystem-service, institutional, and regional cooperation benefits.

¹ Within Output 2.3, the financial analysis further distinguishes between smallholder/farmer group/cooperative investments and indicative commercial models where appropriate, considering the different financing needs and intended beneficiary groups supported by the programme.

13. The programme is expected to generate a mitigation outcome of 6.95 million tCO₂eq over its lifespan (at a cost of EUR 5.16/tCO₂eq for the GCF and EUR 13.49/tCO₂eq for GCF + co-finance) and increase the resilience of 1,046,062 direct beneficiaries and of 1,480,919 indirect beneficiaries.

4. Financial Analysis

4.1 Methodology

14. This financial analysis assesses the financial profitability of selected climate-resilient interventions from a beneficiary perspective using market prices and discounted cash-flow analysis. In line with GCF requirements, the analysis compares the Programme scenario without GCF support and the Programme scenario with GCF support. The purpose of the financial analysis is to assess:
- whether the proposed investments are financially viable for targeted beneficiaries,
 - whether the interventions would remain attractive or feasible without GCF support,
 - the extent to which GCF grant support improves investment feasibility and reduces payback periods; and
 - whether the proposed differentiated matching grants and concessional lending arrangements are appropriate.
15. The financial analysis is undertaken from the perspective of the final beneficiaries and value chain actors expected to adopt the programme-supported investments and practices, using market-based prices for costs and revenues. Key indicators reported, and their standard definitions, are:
- Net Present Value (NPV) - NPV is the sum of discounted net cash flows over the investment period
 - Internal Rate of Return (IRR) - IRR is the discount rate at which NPV equals zero.^{2,3}
 - For agriculture, the debt service coverage ratio (DSCR) of the different interventions is considered in the analysis to assess the ability to repay potential debt obligations under credit scenarios.
 - For annual crop interventions, annual beneficiary net profit is also reported to complement FIRR and provide a measure of the absolute income generated by the investment.
16. For the agricultural interventions, the reported FNPV and FIRR primarily capture the underlying financial attractiveness of the investment package on a beneficiary basis (levered). The affordability effect of alternative financing structures, including the EIB intermediated loan scenario, is also complemented assessed via the DSCR.
17. In some grant-supported annual crop interventions, FIRR should be interpreted with caution. Where matching grant support substantially reduces the beneficiary's upfront private investment requirement, the FIRR can become very high as a percentage indicator even though the absolute gain in beneficiary income remains much more modest. In such cases, the indicator shows the sensitivity of FIRR to a much smaller initial private outlay rather than a proportionately large increase in actual beneficiary returns. Because percentage indicators such as FIRR are sensitive to the beneficiary's initial capital contribution, they are interpreted together with annual net profit and, where relevant, DSCR, in order to provide a more complete assessment of both investment profitability and affordability.
18. Although market-based estimates of the cost of capital were initially considered, they were not considered representative of the financing conditions faced by the target beneficiaries, particularly smallholders, farmer groups, community-based organisations, and cooperatives with limited access to affordable credit. The financial analysis therefore uses weighted average local-currency lending rates as benchmark inputs, namely 17.59% for the Kyrgyz Republic, 23.83% for Tajikistan, and

² A note on interpretability: for some models, IRR may not be computable if the initial investment does not lead to a negative cash flow in year 1.

³ The benefit cost ratio is presented as sense check in some annual crops where matching grant support provides very high IRRs which is due to the sensitivity of the indicator to a reduced upfront private outlay rather than proportionately large absolute gains in beneficiary income.

22.6% for Uzbekistan, and converts these nominal rates into real discount rates by removing the inflation component, which is the medium-term inflation target in each of the countries.⁴ The resulting real rates are applied consistently to constant-price financial cash flows. This approach is intended to better consider the opportunity cost of capital faced in practice by agricultural producers and value chain actors, while remaining grounded in country-specific financial conditions.⁵ It also recognises that actual borrowing costs faced by smallholders and rural enterprises may vary by borrower type and financing channel, and may in some cases exceed the benchmark rates used in the model.

19. The financial models apply intervention-specific time horizons consistent with the agronomic and investment characteristics of the respective production systems and value chains and are consistent with the GCF guidance on estimating the mitigation impact of the programme. Models were constructed for 1-hectare and then scaled according to the rollout/implementation schedule of the programme.
 - 20-year investment period for tree related interventions, reflecting the longer biological life and investment cycle of perennial crops.
 - 8-year investment period for agricultural interventions.
20. Costs and revenues were organized into investment costs (CAPEX), and annual operational costs (OPEX), enabling the derivation of annual net cash flows and the calculation of NPV/IRR under the three different financing scenarios: For the agriculture interventions, the revised model distinguishes three differentiated financing cases: (i) Programme without GCF support, (ii) Programme with GCF support through matching grants, and (iii) Programme with EIB concessional loan support.

4.2 Data collection and processing

21. The sources and assumptions used for this Financial and Economic Analysis are consistent with the wider Funding Proposal package and related annexes, in particular the Feasibility Study and Annex 11a. The analysis was informed through a combination of literature review, stakeholder consultations, and expert assessment undertaken during the development of the feasibility study. These inputs were used to define the programme scenarios, identify the proposed intervention packages, and inform assumptions on costs, benefits, investment requirements, and expected performance. The underlying data and assumptions are included in the Excel model, primarily in the input sheets and the sector-specific result tabs.
22. For the financial analysis, agriculture assumptions are based on the value chain assessment and supporting data included in the workbook, while data for forest and pasture interventions are included directly in the workbook. For the economic analysis, the same technical assumptions are used where relevant, including intervention design, expected adoption, implementation timing, and projected costs and revenues, in order to ensure consistency between the two analyses.
23. The model has been developed using conservative assumptions regarding yields, prices and production costs to show the expected performance of representative smallholders, farmer groups and cooperatives participating in the programme, and not best-performing commercial farms. Consequently, the results should be interpreted as prudent estimates of achievable financial performance under typical beneficiary conditions, with a potential upside for cases in which management practices or market conditions exceed the assumptions applied in the analysis. In

⁴ The conversion from nominal lending rates to real discount rates is based on the medium-term inflation targets reported by the respective central banks. These are 5–7% in the Kyrgyz Republic, 5% in Uzbekistan, and 5% in Tajikistan

⁵ Available central-bank data indicate that local-currency lending rates exceed the policy benchmark in all three countries reviewed. In [Uzbekistan](#), loans to legal entities in national currency averaged 22.6% in March 2026 against a policy rate of 14.0%. In the [Kyrgyz Republic](#), commercial-bank lending in national currency averaged 19.1% in February 2026 against a policy rate of 12.0%; rates reported for non-bank finance and credit institutions were higher still, including 29.7% overall, 29.8% for micro-financing institutions overall, 30.8% for micro-financing institution lending to agriculture, 25.6% for credit unions overall, and 26.1% for credit-union lending to agriculture. In [Tajikistan](#), the refinancing rate was reduced to 7.0% in January 2026, while the weighted average lending rate in national currency was reported at 22.6% in the 2025 banking-sector results.

addition, separate indicative commercial models have been developed to illustrate the financial characteristics commercial actors that would be served under the EIB intermediated loan programme.

24. Following the latest model revision, both the financial and economic analyses are presented in constant prices. For the financial analysis, benchmark local-currency lending rates were first identified in nominal terms and then converted into real discount rates by removing the inflation component. These real rates are applied consistently to constant-price financial cash flows. The economic analysis likewise uses constant prices and applies the social discount rate to real economic costs and benefits.

4.3 Programme scenario definitions

25. The financial analysis distinguishes:
26. **Programme without GCF support:** adoption of the proposed climate-resilient investment package, but financed without grant support, through own resources and/or commercial borrowing. In this scenario, the financial analysis assumes that beneficiaries would need to rely on commercial borrowing to finance the upfront investment costs associated with the proposed climate-resilient measures.
27. **Programme with GCF support through matching grants:** adoption of a defined package of climate-resilient technologies and practices supported by programme investments, technical assistance, and differentiated matching grant support tailored to the characteristics of the investment and the target beneficiary group. For perennial crop investments, the analysis assumes a 65% matching grant and a 35% beneficiary contribution, while annual crop investments (potatoes and horticulture) assume a 50% matching grant and a 50% beneficiary contribution. This scenario is intended to show that the use of grant-based support to reduce upfront investment barriers for targeted beneficiaries, smallholders, individual farmers, farmer groups, cooperatives, and community-based organisations.
28. The matching-grant scenario is intended primarily for the most vulnerable and most credit-constrained beneficiary groups, including smallholders, dehqan farms, individual farmers, farmer groups, cooperatives, and community-based organisations. In the Central Asian context, many such beneficiaries operate very small family-run farms, often below 3–5 hectares and in many cases substantially smaller, with fragmented plots, limited mechanisation, weak collateral, and restricted access to formal finance, extension services, and reliable irrigation. For these beneficiaries, the principal constraint is frequently not the underlying economic viability of the investment, but rather the ability to mobilise the required upfront capital, satisfy collateral requirements, and absorb debt service obligations during the initial years of implementation. The matching grant is therefore designed to address a financing constraint rather than an underlying profitability constraint. The level of grant support is differentiated according to the financing characteristics of the investment. Perennial crop investments receive a higher grant share because they require larger upfront investments and have longer establishment periods before revenues are generated, and annual crop investments receive a lower level of concessional support considering their shorter investment cycles, earlier cash-flow generation, and lower investment requirements. For annual crop investments, alternative matching grant rates were also assessed as part of the financial analysis to examine the effect of different levels of concessionality on investment affordability.
29. For selected perennial crop and horticulture investments separate representative models have been developed for smallholders/farmer groups and for larger commercial actors. The smallholder models reflect the programme's primary target beneficiaries under the matching grant mechanism, while the commercial models are included to illustrate the financial characteristics of larger-scale investments to be served under the EIB intermediated loan programme.
30. The definitions of eligible actors for matching grant support are included below:

Table 1. Definition Kyrgyz Republic

Beneficiary segment	Definition
Peasant farms or individual farmers	Individual producer less than 5 ha
Farmer groups & agricultural cooperatives	An agricultural cooperative is a voluntary association of agricultural producers organized on a membership basis for the purpose of engaging in joint production or other economic activities based on the pooling of their monetary capital contributions, with the aim of meeting the economic and other needs of the cooperative's members.

Table 2: Definition Tajikistan

Beneficiary segment	Definition
Individual / smallholder farmers	Individual producer less than 5 ha
Farmer groups and CBOs	Organised group of individual farmers on a voluntary basis,

Table 3. Definition UZ

Beneficiary segment	Definition
Dehkan farms	Individual producer less than 1 ha
Farms	Individual producer less than 5 ha (as per definition - A farm is a business entity engaged in the production of agricultural products and other activities not prohibited by law, using land plots provided under lease)

31. These actors face significant constraints for accessing finance such as high collateral requirements, underdeveloped rural banking infrastructure, and lack of tailored financial products. Interest rates offered by MFIs are high, in the Kyrgyz Republic the Central Bank reports a rate of 29.42% per annum (*National Bank of the Kyrgyz Republic*, 2026), in Uzbekistan the Central Bank does not report rates by MFIs but a report commissioned by UNDP (2024) identified rates starting at 30% per annum for smallholders in the agriculture sector, while in Tajikistan reported rates for the agriculture sector in general range from 21% to 36% per annum (CACIP, 2025).
32. In this context, the quoted beneficiary-to-grant contribution ratio should not be interpreted as a flat support rate applied identically across all beneficiary categories and all investments. Rather, it should be understood as an indicative benchmark across a differentiated beneficiary portfolio, in which smaller and more vulnerable actors require higher concessional support than more commercially mature and bankable borrowers. The objective of the matching grant mechanism is therefore not to maximise investment returns, but to overcome affordability barriers and crowd in private investment from beneficiary groups that would otherwise remain excluded from CRLE agricultural investments. The matching grant therefore addresses a financing market failure rather than subsidising investments that would otherwise proceed under commercial conditions. The differentiated grant structure adopted in the analysis also is due to the different financing needs of annual and perennial crop investments, ensuring that the level of concessionality is better aligned with the underlying investment profile and financing constraints.
33. **Programme with concessional loan support through the EIB intermediated loan programme:** adoption of a defined package of climate-resilient technologies and practices by MSMEs, clusters, and other commercially oriented actors, using concessional debt financing through the EIB intermediated loan programme. This scenario is intended to show the use of improved financing conditions for beneficiaries that are more likely to access and absorb debt financing, while still facing affordability constraints and high climate and market risks. The EIB intermediated loan programme is designed to complement the matching grant mechanism by serving beneficiary groups with greater capacity to access and service debt finance.
34. The EIB scenario does not assume a one-to-one pass-through of sovereign EIB borrowing terms to final beneficiaries. In practice, the facility would be intermediated through the sovereign and then on-lent via participating local financial institutions, so final end-borrower pricing would still need to consider intermediation costs, local operating margins, credit risk, liquidity risk, and, where relevant, currency and hedging costs. The concessional benefit of the EIB facility is only passed through partly to the final borrower via pricing and partly through improved access to finance and, where relevant, longer repayment tenors. For perennial orchard investments, a dedicated financing scenario with a longer tenor (7 years) and grace period (4 years) is also considered to better attuned to their delayed revenue profile.

35. For modelling purposes, the Programme scenario without GCF support assumes that beneficiaries must finance upfront investment costs through commercial borrowing on terms approximated by a 30% annual interest rate and a 3-year tenor. This highlights the limited availability of affordable, longer-tenor finance for comparable rural borrowers in the programme context and serves as a proxy for the cost of capital faced in the absence of grant support. It is used to test whether the proposed investments would remain financially feasible under realistic market conditions and to assess the extent to which GCF support improves affordability and reduces barriers to adoption.
36. The programme scenario with concessional loan support through the EIB intermediated loan programme includes an indicative EIB-intermediated loan programme scenario for eligible agriculture investments under Output 2.3. In this scenario, indicative local-currency lending rates are used as proxy of current market conditions, combined with a 5-year repayment tenor for annual crop investments. For perennial orchard investments, a dedicated financing scenario is modelled using a 7-year tenor and a 4-year grace period to better align debt service with the establishment period and delayed cash-flow generation characteristic of orchard systems. The EIB intermediated loan programme case is modelled as an assumption-based scenario assuming that the beneficiary investment is covered through 75% loan and 25% equity, with the objective of illustrating how the programme co-financing could improve affordability and support additional uptake of revenue-generating investments. Pending confirmation of final on-lending arrangements and end-borrower pricing, this scenario should be interpreted as illustrative rather than as a finalised financing structure.
37. This three-scenario structure is applied only to the revenue-generating agricultural interventions under Output 2.3. Forest and pasture interventions continue to be assessed under the standard “with GCF support” and “without GCF support” logic, as these interventions are not structured around the same debt-financing assumptions and do not generate the same type of direct financial returns
38. The table below summarises the interventions in the different scenarios for the different crops and value chains.

Table 4. Overview of programme interventions

	Proposed programme interventions / proposed climate-resilient technologies to be promoted
Wheat (rainfed cereals)	The programme will support conservation agriculture (CAg) through investments and technical assistance, including: • no-till seeding • cover crops (legumes, grasses, broadleaf species) for erosion control and soil fertility; crop rotation (including promotion of drought-resistant oilseed crops and legumes) • improved plant nutrition and pest management, with emphasis on correcting imbalanced fertilizer use (overuse of nitrogen/urea vs underuse of phosphorus and potassium) Financial support: focus on making no-till seeders available and accessible to smallholder farmers (in the Kyrgyz Republic this sector is only covered through the No-Till Adoption Accelerators). Technical assistance: training of farmers and no-till service providers, plus capacity development on other CAg components.
Fruit trees	The programme will support the following technologies and practices through investments and technical assistance: • use of drought/heat/flood/frost-resilient rootstocks and fruit cultivars, including support to local nurseries to grow and craft locally adapted varieties/rootstocks

	• improved orchard management (e.g., mulching/soil cover; pruning practices including summer pruning to reduce frost risk; frost resilience measures such as cryoprotectors and other management practices) • drip irrigation (40–70% water savings; potential yield increase 25–100%) supplied via water harvesting infrastructure/reservoirs or tubewells depending on local conditions, with filters to prevent clogging; optional integration of fertigation (can reduce mineral fertilizer and pesticide use by 21–33% and reduce nutrient leaching/subsoil pollution) • insect-proof nets/shade nets to moderate temperatures, prevent sunburn, and support IPM via physical pest exclusion Financial support: focus on making climate-resilient rootstocks/cultivars, drip irrigation and fertigation equipment, and horticultural netting available and accessible to smallholder farmers. Technical assistance: training on improved orchard management, including IPM and frost protection.
Horticulture (vegetables & berries)	The programme will support the following technologies and practices through investments and technical assistance: • use of climate-resilient seeds and seedlings (testing varieties for drought/heat tolerance via local extension organizations; emphasis on climate-adapted rootstocks tolerant to water scarcity, extreme heat (often above 40°C), winter frost events, and increasing soil salinity; promotion of grafted seedlings on stress-tolerant rootstocks and hybrids bred for climate variability) • drip irrigation (40–70% water savings; potential yield increases 25–100%), supplied via reservoirs/water harvesting infrastructure or tubewells depending on local conditions, with filters to prevent clogging; optional integration of fertigation (can reduce mineral fertilizer and pesticide use by 21–33% and reduce nutrient leaching/subsoil pollution) • improved plant nutrition (addressing imbalanced fertilizer use biased toward nitrogen/urea and neglect of phosphorus and potassium) to increase productivity and resilience and reduce GHG emissions, nutrient loss and eutrophication • insect-proof nets/shade nets (including targeted support for tomato protection and testing effectiveness against <i>Tuta absoluta</i>; also contributing to IPM) Financial support: provided through matching grants to help make climate-resilient seeds/seedlings, drip irrigation and fertigation equipment, trellises, and horticultural netting available and accessible to smallholder farmers. Technical assistance: training on irrigation, plant nutrition (including fertigation) and plant protection.
Potato (seed potato production in highland areas)	The programme will promote seed potato production in suitable highland areas (e.g., KG and TJ above 1,800 m a.s.l.) through investment support for: • upgrading local seed multiplication, including starting multiplication from Super-Super Elite (SSE) seeds instead of Elite seeds to reduce transport cost per kg of seed (illustrative reduction to 2.5% of current rate) • sprinkler irrigation (compared to furrow irrigation) to improve soil moisture management and reduce water consumption, using local streams or tubewells depending on local conditions

	• improved plant nutrition, addressing imbalanced fertilizer use biased toward nitrogen/urea vs limited phosphorus and potassium. The combined approach is expected to provide adaptation benefits (reduced water consumption; varieties adapted to ware potato producers' climates) and mitigation co-benefits (reduced CO₂, methane and N₂O emission intensity per hectare and per kg; reduced nutrient loss/eutrophication; reduced seed transport emissions) Financial support: focus on making SSE seeds and irrigation equipment available and accessible to smallholder farmers. Technical assistance: training on best irrigation and plant nutrition practices in seed potato production, plus training on suitable crop rotations (including integrating legumes such as alfalfa/clover) to break soil-borne disease cycles and enhance soil organic matter and fertility.
Pasture	The programme will support climate-resilient pasture management and restoration through investments and technical assistance, including: • rehabilitation of degraded pasture through reseeded/seed broadcasting and improved pasture management practices • installation or rehabilitation of water points at higher density to improve livestock access to water and reduce pressure on surrounding grazing areas • improvement of access infrastructure, including roads/tracks, to support more effective pasture management and access to grazing areas • fencing and related measures to enable controlled grazing, pasture rotation, and protection of restored areas • support for pasture management equipment and machinery where relevant Financial support: focus on making pasture restoration inputs, water infrastructure, fencing materials, and related equipment available and accessible to pasture users and community institutions. Technical assistance: training on rotational grazing, pasture restoration, water point management, protection of rehabilitated areas, and sustainable pasture governance.
Forest	The programme will support forest restoration, assisted regeneration, and afforestation/reforestation (AR) through investments and technical assistance, including: • establishment and restoration of forest plantations and degraded forest landscapes through planting, replanting, and assisted natural regeneration • fencing and other protection measures to reduce grazing pressure and improve survival rates of planted and naturally regenerating trees • irrigation and watering support where needed during establishment, including provision of pumps or other appropriate watering equipment, depending on local conditions • use of locally adapted and climate-resilient tree species and planting material, including species with value for timber, fruit, and non-timber forest products • improved forest and plantation management practices to increase survival, productivity, and long-term resilience.

Financial support: focus on making planting material, fencing, irrigation/watering equipment, and other establishment inputs available and accessible to beneficiary communities and producers.

Technical assistance: training on site preparation, planting and replanting, assisted natural regeneration, protection measures, watering regimes, sustainable NTFP collection practices, and sustainable management of plantations and restored forest areas.

Source: Own elaboration

4.4 Financial results – forest interventions

39. The financial analysis for the forest sector shows that these investments are generally not financially attractive when assessed only on the basis of direct cash returns to implementing actors. This is expected. Forest restoration and sustainable forest management create much of their value through public goods and other non-market benefits, such as carbon sequestration, biodiversity conservation, healthier ecosystems, and greater climate resilience, rather than through financial returns. Their rationale lies primarily in the broader economic, environmental and social benefits they generate, which are only partly considered in the financial analysis and are more appropriately captured in the economic assessment.
40. The results confirm this pattern. Under the Programme with GCF support scenario, financial performance remains weak across all three countries, with negative FNPVs except for the Kyrgyz Republic. Under the Programme without GCF support (loan) scenario, financial performance deteriorates further, with more negative FNPVs. Grant support improves financial performance, but that forest interventions remain financially unattractive in most cases and cannot be justified on commercial grounds alone

Table 5. Financial results - forest interventions

	FIRR	FNPV
Programme with GCF support		
KG	12.9%	319,607
TJ	4.9%	(2,027,575)
UZ	N/A ⁶	(3,801,313)
Programme without GCF support		
KG	-1.9%	(5,230,937)
TJ	-0.8%	(4,691,711)
UZ	N/A	(6,889,774)

Source: Own elaboration

4.5 Financial results – pasture interventions

41. The financial results for pasture interventions show that these investments are not primarily designed to generate strong direct financial returns at the level of the implementing actors, but rather to enhance resilience, address degradation and restore the productive and ecological functions of rangeland systems over time. This is shown in the model results, where the direct financial returns remain limited despite the importance of these interventions for resilience, restoration, and improved ecosystem functioning.

⁶ Cashflow remains negative throughout the programme lifetime. Thus no FIRR can be calculated.

42. Under both programme scenarios, financial performance remains weak across the three countries, although GCF support improves performance substantially relative to the loan case. Under the Programme with GCF support scenario, all three country cases remain negative. Under the Programme without GCF support (loan) scenario, all three country cases also remain negative.
43. The results suggest that pasture restoration and improved pasture management would not be attractive on commercial grounds alone. This is not unexpected, as the main value of these interventions lies in benefits that are only partially captured in financial cash flows, such as reduced land degradation, improved ecosystem functioning, greater climate resilience of pastoral livelihoods, and wider environmental benefits. As in the case for forests, the case for pasture interventions lies their broader economic and public-good value, which is better captured in the economic analysis.

Table 6. Financial results - pasture interventions

	FIRR	FNPV
Programme with GCF support		
KG	4.8%	(7,728,608)
TJ	8.8%	(7,389,020)
UZ	8.8%	(3,668,096)
Programme without GCF support (loan)		
KG	1.8%	(13,289,114)
TJ	5.4%	(11,795,684)
UZ	5.4%	(6,118,377)

Source: Own elaboration

4.6 Financial results – agriculture interventions

44. The agriculture analysis distinguishes between smallholder annual crop investments, smallholder perennial crop investments, and indicative commercial crop and orchard investments, reflecting differences in target beneficiary groups across the programme between GCF and the EIB intermediated loan programme.
45. The agriculture results are stronger than the forest and pasture results. That is not surprising, because these are the interventions that generate direct returns for beneficiaries. However, financial viability alone does not necessarily mean that all actors can access commercial or concessional debt finance. Thus, the analysis considers both traditional discounted cash-flow indicators (FIRR and FNPV) and the debt service coverage ratio (DSCR) to assess whether beneficiaries are able to undertake and finance the proposed investments under different financing structures.
46. Across all three countries, the commercial loan scenario demonstrates that several interventions are financially viable but remain difficult to finance under prevailing market conditions. Although some interventions generate positive FIRRs and FNPVs, debt service capacity frequently remains constrained, with DSCR values under 1, indicating that beneficiaries would struggle to service commercial debt under the assumed financing terms. The differentiated matching grant scenario produces the strongest financial performance by reducing beneficiaries' upfront investment requirements, while the EIB intermediated loan programme improves affordability by providing financing on more favourable terms than commercial borrowing and, for perennial orchard investments, through longer repayment tenors and grace periods aligned with the investment cycle.
47. For annual crop interventions supported through the matching grant mechanism, FIRRs should be interpreted with caution and complemented by the DSCR and net profit. Because the matching grant reduces the beneficiary's upfront capital contribution, the same stream of incremental benefits is generated from a smaller private investment, mechanically increasing the calculated FIRR. This effect is particularly evident for annual crops where investment costs are relatively modest, and

revenues are generated within the first production cycle. The resulting FIRR therefore show the effect of concessional financing on beneficiary affordability rather than proportionately larger increases in underlying farm profitability. This interpretation is further highlighted by the annual net profit results, which remain relatively modest across the interventions (approximately EUR 500–2,900 per year), demonstrating that the matching grant enables incremental improvements in smallholder incomes rather than generating excessive beneficiary returns. Beneficiary net profit remains unchanged across alternative matching grant rates because the grant affects only the financing structure and not the underlying economics.

48. The no-till wheat intervention in the Kyrgyz Republic follows a different financing model from the other agriculture interventions. It shows a positive FNPV, but FIRR is not meaningful in the standard sense. This reflects the financing and modelling structure rather than weak performance. Under the intervention design, direct seeders are not assumed to be purchased by final beneficiaries/smallholders as they would prove unviable for them. Instead, they are financed through an asset and input-based revolving scheme mechanism (No-Till Adoption Accelerator⁷), under which machinery is acquired and held by an intermediary (Conservation Agriculture Team). As a result, final beneficiaries do not face a large upfront capital outlay, and the usual initial negative cash flow needed to derive a standard FIRR at beneficiary-level does not arise.
49. Annual crop interventions (potatoes and horticulture) show a consistent pattern across the three countries. Under commercial borrowing, financial performance ranges from marginally viable to financially unattractive, while debt service capacity generally remains constrained, with average DSCR values below 1. Alternative matching grant rates of 30%, 40%, and 50% are also presented to illustrate how different levels of concessionality affect FIRR, FNPV, and payback. Annual net profit remains unchanged because the grant affects the financing structure rather than the underlying production economics.
50. Country-level differences largely show variations in production systems, production costs, and the scale of investment across the three countries. The overall pattern is consistent. Commercial borrowing results in limited debt-service capacity for smallholders, whereas differentiated matching grants substantially improve affordability and enable adoption. The EIB loan scenario provides an additional financing option for more commercially oriented beneficiaries, although its effectiveness depends on the underlying investment profile and repayment schedule.
51. Perennial orchard investments are assessed separately because their financial characteristics differ fundamentally from those of annual crops. Orchard systems require higher upfront investment and experience a delayed revenue profile during the establishment period. This is the reason why the programme evaluates commercial orchard investments under a dedicated financing scenario assuming a 7-year tenor with a 4-year grace period. Under this financing structure, average DSCR values exceed 1 across all orchard models, demonstrating that repayment capacity improves substantially when financing terms are aligned with the biological investment cycle.
52. The DSCR results help explain that a number of interventions that look viable in discounted cash-flow terms still show limited debt-service capacity under the standard loan case, particularly in the early years. This is particularly evident for perennial orchard investments, which require a dedicated financing structure due to their longer establishment period.
53. The results support the programme's differentiated financing architecture. Matching grants are targeted towards smallholders, farmer groups and cooperatives facing affordability and financing constraints, while concessional EIB lending is intended for more commercially oriented actors capable of servicing debt. This differentiated approach allows programme resources to be better aligned with beneficiary needs and investment characteristics.
54. Table 7 presents the results for the three principal financing scenarios: (i) commercial borrowing, assuming a 3-year tenor; (ii) differentiated matching grants, assuming a 65% grant (35% beneficiary contribution) for perennial crop investments under different matching grant scenarios (30%, 40% and 50) to illustrate the effect of different levels of concessionality on investment affordability; and (iii) the EIB intermediated loan programme, assuming a 5-year tenor for annual crop investments. Orchard investments are presented separately under a dedicated financing scenario assuming a 7-year tenor with a 4-year grace period, considering the longer establishment period and delayed revenue generation characteristic of perennial crops.

⁷ Please refer to appendix for description of the No-Till Adoption Accelerator.

Table 7. Financial results agriculture interventions – annual crops

	FIRR	FNPV	Average DSCR	Payback period	Net profit (annual revenue minus operating cost)
Kyrgyz Republic					
Wheat					
No-till	N/A	1,958		N/A	362
Potato					
Loan	4.69%	(331)	0.57	7.31	
Matching grant 50%	43.42%	1,395		3.12	536
Matching grant 40%	34.36%	1,168		3.54	536
Matching grant 30%	27.59%	941		4	536
EIB intermediated loan programme	10.70%	(8)	1.01	7.03	
Horticulture smallholder					
Loan	6.15%	(365)	0.50	7.22	
Matching grant 50%	61.78%	2,948		2.56	933
Matching grant 40%	45.99%	2,521		3.02	933
Matching grant 30%	35.56%	2,094		3	933
EIB intermediated loan programme	19.63%	280	0.88	4.85	
Tajikistan					
Potato					
Loan	5.19%	(1,214)	0.49	7.33	
Matching grant 50%	66.50%	3,421		2.46	1,451
Matching grant 40%	47.88%	2,706		2.95	1,451
Matching grant 30%	36.18%	1,992		3	1,451
EIB intermediated loan programme	2.51%	(778)	0.76	7.82	
Horticulture					
Loan	0.72%	(2,098)	0.46	7.90	
Matching grant 50%	54.64%	3,418		2.74	1,647
Matching grant 40%	40.16%	2,575		3.26	1,647
Matching grant 30%	30.54%	1,732		4	1,647
EIB intermediated loan programme	-4.83%	(1,565)	0.70	No Payback	
Uzbekistan					
Potato					
Loan	7.20%	(837)	0.51	7.11	

Matching grant 50%	70.30%	3,458		2.39	1,350
Matching grant 40%	50.53%	2,813		2.87	1,350
Matching grant 30%	38.25%	2,168		3	1,350
EIB intermediated loan programme	10.82%	(247)	0.82	7.32	
Horticulture					
Loan	7.01%	(1,807)	0.51	7.13	
Matching grant 50%	62.24%	6,820		2.55	2,845
Matching grant 40%	48.67%	5,899		2.93	2,845
Matching grant 30%	37.84%	4,626		3	2,845
EIB intermediated loan programme	10.42%	(561)	0.81	7.34	

Source: Own elaboration

55. The indicative commercial annual crop models have a different financial profile from the smallholder models. Although commercial borrowing still results in DSCR values below 1, the indicative EIB intermediated loan programme increases DSCR above 1 across all commercial horticulture models, highlighting that commercially oriented enterprises are better able to utilise debt financing under improved financing conditions.

Table 8. Annual crops – commercial actors

	FIRR	FNPV	Average DSCR	Payback period
KG				
Horticulture MSME				
Loan	24.31%	1,531	0.63	NA
EIB intermediated loan programme	38.18%	2,758	1.19	3.35
TJ				
Horticulture MSME				
Loan	36.10%	928	0.71	NA
EIB intermediated loan programme	47.97%	2,192	1.19	NA
UZ				
Horticulture MSME				
Loan	35.53%	5,410	0.73	2.12
EIB intermediated loan programme	50.09%	8,419	1.27	1.85

Source: Own elaboration

56. Table 9 shows the results for representative smallholder orchard investments using a 7-year tenor with a 4-year grace period and compares them to the standard commercial loan case. Compared with annual crops, orchard investments require substantially higher upfront capital expenditure and generate revenues only after the establishment period. The longer repayment tenor and grace period therefore provide a more realistic assessment of debt affordability for these investments.

Even under these improved financing assumptions, representative smallholder orchards continue to show constrained repayment capacity, illustrating the financing challenge posed by perennial crop establishment.

Table 9. Results for smallholder orchards – compared against a commercial loan case and EIB intermediated loan with longer tenor and grace period

	FIRR	FNPV	Average DSCR	Payback period
KG				
Apricots fresh				
Loan	7.73%	(1,006)	-0.30	12.24
Matching grant	16.85%	1,281		8.15
EIB intermediated loan programme	9.83%	(234)	0.60	12.61
Apricots drying varieties				
Loan	11.96%	426	-0.28	10.20
Matching grant	21.51%	3,094		7.32
EIB intermediated loan programme	15.81%	1,345	0.83	10.47
TJ				
Apricots fresh				
Loan	19.00%	1,170	-0.17	8.36
Matching grant	30.02%	9,504		6.41
EIB intermediated loan programme	24.29%	4,536	0.89	8.89
UZ				
Apricots fresh				
Loan	12.05%	(7,216)	-0.21	10.43
Matching grant	21.26%	4,833		7.90
EIB intermediated loan programme	14.55%	(2,287)	0.54	11.01
Apricots dried				
Loan	12.14%	(7,059)	-0.20	10.40
Matching grant	21.42%	4,991		7.88
EIB intermediated loan programme	14.69%	(2,130)	0.54	10.98

Source: Own elaboration

57. Table 10 presents indicative commercial orchard models using the same financing assumptions (7-year tenor and 4-year grace period) to illustrate the financial profile of larger, commercially oriented investments.
58. Under the indicative EIB financing structure, all commercial orchard models achieve DSCR values above 1, while FIRRs and FNPVs also improve relative to the conventional loan scenario.

Table 10. Commercial orchard models – comparison of conventional loan and indicative EIB intermediated loan programme

	FIRR	FNPV	Average DSCR	Payback period
KG				
Apricots fresh				
Loan	24.37%	6,367	-0.20	7.40
EIB intermediated loan programme	33.15%	7,139	1.70	7.00
Apricots drying varieties				
Loan	24.04%	7,420	-0.16	7.66
EIB intermediated loan programme	32.86%	8,339	1.47	7.55
TJ				
Apricots fresh				
Loan	37.31%	27,425	-0.01	6.06
EIB intermediated loan programme	50.66%	30,792	2.24	4.67
UZ				
Apricots fresh				
Loan	28.27%	19,693	0.09	6.66
EIB intermediated loan programme	39.63%	24,623	1.52	4.74
Apricots dried				
Loan	32.27%	27,687	0.15	6.26
EIB intermediated loan programme	45.70%	32,616	1.79	4.46

Source: Own elaboration

Table 11. Debt-service capacity of representative smallholder and commercial orchard models under alternative scenarios

Scenario	Representative smallholder orchard (Indicative EIB scenario)	Commercial orchard (Indicative EIB scenario)
Base case	0.54–0.89	1.47–2.24
10% lower benefits	0.45–0.76	1.23–1.97
10% higher investment costs	0.49–0.81	1.33–2.03

Source: Own elaboration

59. The results highlight the different financing profiles of the two beneficiary groups. Smallholder orchard investments show limited debt-service capacity at the base case even under EIB concessional financing assumptions supporting the rationale for grant financing. The commercial orchard models maintain DSCR values above one under both downside scenarios, suggesting that commercially oriented producers are better placed to utilise debt financing.

4.6.1 Consolidated agriculture results

60. At an aggregate level, the financial results for the agricultural interventions are stronger than those for forests and pastures, as these investments generate more immediate and tangible beneficiary-

level returns through higher productivity, improved input and water-use efficiency, and stronger market participation. However, the consolidated indicators should be interpreted as programme-level summary measures combining different beneficiary categories and investment types, they provide an overall indication of programme-level financial performance rather than to represent any single beneficiary or intervention.

61. As outlined above, in the current modelling for the wheat interventions in KG, direct seeders and machinery services are assumed to be provided through aggregating actors rather than purchased directly by final beneficiaries, in line with the project design. As a result, no major upfront investment is recorded at beneficiary-level in this case. This improves the beneficiary-level cash-flow profile but also affects the interpretation of FIRR, since the absence of a material initial negative cash flow means that the FIRR cannot be calculated in the standard way. For this reason, the KG results are reported with a positive FNPV and B/C ratio, but with FIRR shown as NA. This is not due to weak performance but due to the structure of the intervention and the fact that part of the capital investment is borne outside the beneficiary cash-flow model. This modelling feature should thus be considered when interpreting the country-level results.
62. Table 12 summarises the financial performance of the agriculture portfolio at beneficiary-level by aggregating the intervention-level models according to the planned programme rollout

Table 12. Consolidated agriculture financial results

	FIRR	FNPV
Programme with GCF support		
KG	30.4%	16,458,443
TJ	34.7%	44,414,939
UZ	25.9%	46,898,185
Programme without GCF support (loan)		
KG	16.9%	7,353,728
TJ	29.0%	34,253,350
UZ	22.7%	33,738,609

Source: Own elaboration

5. Economic Analysis

5.1 Methodology

63. The economic analysis assesses the programme from a broader social perspective and complements the financial analysis by capturing costs and benefits that are not reflected in direct financial cash flows. It is undertaken at beneficiary-level and compares the stream of economic costs and benefits generated by the programme over its implementation and benefit period. The purpose is to determine whether the programme is justified from an economic perspective, considering not only direct financial gains but also wider social and environmental effects.
64. The economic analysis is based on a cost-benefit approach. It builds on the financial performance of the programme-supported interventions and scales these to beneficiary-level using the expected area, beneficiary reach, and implementation schedule of the programme. In addition to the direct gains associated with the revenue-generating agricultural interventions, the economic analysis incorporates the value of carbon benefits expected to accrue over the programme lifetime through avoided emissions and removals in the AFOLU sectors. These carbon externalities are valued using a shadow price of carbon (SPC), which represents the value of carbon emissions or removals in the economic analysis and is intended to show the social value of reducing greenhouse gas emissions. A price of carbon of USD 40 (converted to EUR equivalent) is used, which falls at the lower end of the range of the World Bank guidance on the use of *Shadow Price of Carbon in Economic Analysis* (World Bank, 2024).
65. In the economic analysis, investment grants are treated as financing transfers rather than as economic benefits. They are therefore excluded from the economic benefit stream, while the full real resource costs of the underlying investments remain captured on the cost side. This ensures that the economic analysis does not overstate returns by counting financing transfers as benefits.

66. Likewise, the principal of the EIB-intermediated loan programme is not treated as an economic cost or benefit in the economic analysis, as it is a financing flow rather than a consumption of real resources. The role of the EIB facility in the economic analysis is considered only insofar as it supports additional uptake of eligible investments and therefore affects the real cost and benefit streams captured in the programme's economic cash flows
67. The programme's economic performance is assessed using the standard indicators of Economic Net Present Value (ENPV), Economic Internal Rate of Return (EIRR), and Benefit-to-Cost Ratio (BCR). A programme is considered economically justified if the ENPV is positive and the EIRR exceeds the selected social discount rate and BCR exceeds 1. For this analysis, a 6% social discount rate is applied.⁸ This rate is used to discount future economic costs and benefits and aims to capture the long-term social opportunity cost of capital and the intertemporal value of benefits generated by climate-resilient and low-emission investments.
68. While the economic analysis includes the programme's carbon benefits, it does not monetise all benefits generated by the programme. In particular, due to methodological and valuation challenges, the analysis does not quantify the economic value of reduced land degradation, avoided ecosystem deterioration, enhanced biodiversity, and several wider resilience and ecosystem-service benefits. These effects should be material, especially in relation to forest, pasture, and landscape restoration interventions, but are treated qualitatively rather than monetised in the model. As a result, the economic results should be interpreted as conservative and are likely to underestimate the programme's full social and environmental value.

5.2 Data collection and processing

69. The economic analysis draws on the same technical assumptions used in the financial analysis, including intervention design, expected adoption, implementation timing, and projected costs and revenues. Programme costs are taken from the proposed budget and annual disbursement schedule. Carbon benefits are derived from the programme's estimated greenhouse gas mitigation impact over the analysis period (Annex 13) and valued using the selected shadow price of carbon. Sensitivity analysis was also used to test the robustness of the results under alternative assumptions, including changes in costs, revenues, and discount rates.

5.3 Results

70. The economic analysis shows that the programme is economically justified both at the level of the full programme investment and at the level of the GCF-supported contribution. As outlined above, the economic assessment takes a broader perspective than the financial analysis and captures the social value of the programme beyond direct financial returns, including the value of carbon benefits to be accrued over the lifetime of the programme. At the same time, several important environmental, social and resilience benefits are not monetised in the model. The results presented below are conservative.
71. At aggregate level, the programme with GCF + co-finance yields an EIRR of 14.6%, an ENPV of EUR 372,745,920, and a BCR of 1.35. These results highlight that the programme generates positive economic returns and that the benefits exceed the costs over the period considered. Country-level results are positive across all three countries. The Kyrgyz Republic yields an ENPV of EUR 33,866,723 and a BCR of 1.12, Tajikistan an ENPV of EUR 176,249,941 and a BCR of 1.62, and Uzbekistan an ENPV of EUR 162,629,256 and a BCR of 1.32. The programme is economically justified in all three countries under the assumptions adopted in the analysis.
72. The economic analysis of the GCF contribution only also yields positive results. The GCF-supported portion of the investment results in an EIRR of 12.6%, an ENPV of EUR 121,275,633, and a BCR of 1.19. This suggests that the GCF-supported investments are directed toward activities that generate strong wider social, environmental and climate benefits and remain economically justified overall. Country-level results for the GCF contribution are also positive throughout, with EIRRs of 15.3% in the Kyrgyz Republic, 14.0% in Tajikistan, and 8.6% in Uzbekistan, corresponding to ENPVs of EUR 51,391,259, EUR 53,344,203, and EUR 16,540,170, and BCRs of 1.30, 1.33, and 1.06, respectively. The positive economic performance across all three countries demonstrates that

⁸ A 6% social discount rate was used as the base case for the economic analysis, with sensitivity testing undertaken at alternative discount rates from 2% to 12%

the programme's concessional resources are targeted towards activities that generate positive economic returns while delivering substantial wider social, environmental and climate benefits. As outlined above, the quantified economic analysis does not fully capture the programme's total value. Important non-monetised benefits include reduced land degradation, avoided ecosystem deterioration, enhanced biodiversity, improved soil and water functions, improved watershed protection, stronger climate resilience of rural livelihoods, and wider social and institutional benefits generated by the programme. Accordingly, the reported economic indicators are likely to underestimate the programme's total economic value.

Table 13. Economic results from the programme – GCF + co-finance

	EIRR	ENPV	BCR
GCF support + co-finance	14.6%	372,745,920	1.35
KG	10.1%	33,866,723	1.12
TJ	17.8%	176,249,941	1.62
UZ	14.1%	162,629,256	1.32

Source: Own elaboration

Table 14. Economic results for the GCF contribution only

	EIRR	ENPV	BCR
GCF support	12.6%	121,275,633	1.19
KG	15.3%	51,391,259	1.30
TJ	14.0%	53,344,203	1.33
UZ	8.6%	16,540,170	1.06

Source: Own elaboration

5.4 Sensitivity Analysis

73. The sensitivity analysis shows that the programme remains economically justified under a range of alternative assumptions. ENPV remains positive for both the full programme investment and the GCF contribution across all tested social discount rates from 2% to 12%, indicating that the programme's economic viability is robust to alternative discount-rate assumptions. The persistence of positive ENPVs across the full range of discount rates suggests that the programme's economic justification is not sensitive to the choice of social discount rate.

Table 15. Sensitivity of economic results to changes in discount rates

		ENPV (GCF + Co-finance)	ENPV (GCF only)
Discount rate	2%	783,477,788	278,390,943
	4%	547,575,616	188,122,672
	6% (base case)	372,745,920	121,275,633
	8%	242,223,445	71,421,704
	10%	144,137,832	34,009,717
	12%	70,004,318	5,786,383

Source: Own elaboration

74. Sensitivity analysis was also carried out for reductions in benefits and increases in investment costs. The programme remains economically justified under all scenarios tested. As expected, reductions in benefits have a greater effect on economic performance than equivalent increases in investment costs, showing the importance of sustained productivity gains and other programme benefits over the analysis period. Nevertheless, even under the most adverse downside scenario

tested (20% lower benefits), the programme continues to generate a positive ENPV of EUR 83.9 million, an EIRR of 8.1%, and a BCR of 1.09, all above the selected social discount rate and economic viability threshold. Under the 20% higher cost scenario, the programme still yields an EIRR of 10.0%, an ENPV of EUR 192.4 million, and a BCR of 1.15. The programme's economic justification is more sensitive to reductions in benefits than to equivalent increases in investment costs, although it remains economically viable under all downside scenarios considered.

Table 16. Sensitivity of economic analysis to changes in programme costs and benefits

Scenario	EIRR	ENPV	BCR
10% lower benefits	11.4%	228,318,403	1.21
15% lower benefits	9.7%	156,104,645	1.15
20% lower benefits	8.1%	83,890,887	1.09
10% higher costs	12.2%	282,557,711	1.24
15% higher costs	11.1%	237,463,607	1.20
20% higher costs	10.0%	192,369,503	1.15

Source: Own elaboration

75. Given the contribution of carbon benefits to the programme's overall economic performance, an additional sensitivity analysis was undertaken using alternative shadow prices of carbon. The purpose of this analysis is to assess whether the programme remains economically justified under lower carbon values than those adopted in the base case. The results demonstrate that the programme remains economically justified across the full range of carbon values tested. Even at a shadow price of EUR 5 per tonne of CO₂e, the programme continues to generate positive ENPVs for both the full programme and the GCF-supported contribution.

Table 17. Sensitivity of economic analysis to changes in carbon price

Scenario	ENPV (GCF + Co-finance)	ENPV (GCF only)
EUR 5	268,855,129	17,384,842
EUR 10	287,407,056	35,936,769
EUR 20	324,510,910	73,040,623
EUR 33 (base case) ⁹	372,745,920	121,275,633
EUR 40	398,718,617	147,248,330

Source: Own elaboration

6. Conclusion

76. The analysis shows that the programme is justified overall from both a financial and an economic perspective. The financial analysis confirms that direct financial returns are concentrated in the agricultural and value chain interventions under Component 2, while the enabling activities under Component 1, the regional cooperation activities under Component 3, and most forest and pasture interventions under Output 2.2 generate limited to no direct financial returns. This shows the structure of the programme, where a significant portion of the investments are directed toward public goods, enhancing resilience, restoration, and other benefits that are not captured through beneficiary-level cash flows. Accordingly, beneficiary-level financial returns alone do not provide a complete assessment of the programme's overall value.
77. The financial results show that GCF support enables adoption of CRLE revenue-generating investments amongst target beneficiaries by addressing the financing constraints faced by different beneficiary groups. For representative smallholders, farmer groups and cooperatives, differentiated matching grants reduce upfront investment barriers and improve affordability. For more commercially oriented beneficiaries, the indicative EIB intermediated loan programme

⁹ Already most conservative within the range proposed by the World Bank in its guidance note.

demonstrates the potential role of concessional debt financing where repayment capacity is sufficient. This is particularly important in a context where smallholders, producer groups, leskhozos, and pasture management organisations face limited access to affordable finance, low debt-bearing capacity, and high perceived risk associated with CRLE investments. The analysis therefore supports the case for a differentiated financing architecture combining GCF grant financing for the programme's primary target beneficiaries with concessional lending for commercially oriented investments, while also supporting the large share of non-revenue-generating activities that are central to the programme's objectives.

78. The economic analysis confirms that the programme generates positive economic returns overall. Again, these results should be interpreted as conservative, since the analysis includes the value of carbon benefits but does not fully monetise several important additional benefits, including reduced land degradation, avoided ecosystem deterioration, enhanced biodiversity, and wider resilience and ecosystem-service benefits. The programme's total economic value is therefore likely to be higher than the one captured in the quantified economic indicators presented in this analysis.
79. The programme presents a strong case for GCF grant financing. The financial analysis demonstrates that differentiated financing instruments are required to address the distinct financing constraints faced by representative smallholders and commercially oriented beneficiaries, while the economic analysis confirms that the programme generates positive economic returns under conservative assumptions. By combining enabling investments, restoration and sustainable land management, support for productive agricultural investments, and regional cooperation, it is expected to generate resilience, mitigation, and broader environmental and social benefits that go beyond those directly captured in the quantified financial and economic analysis.

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Appendix A

No-Till Adoption Accelerator

Objective

The No-Till Adoption Accelerator is an asset and input based revolving scheme designed to improve smallholder farmers' access to quality agricultural inputs and conservation agriculture machinery while preserving the initial grant capital. Rather than providing one-off grants, beneficiaries repay the value of the support received, allowing the same resources to finance subsequent investment cycles. Over time, the mechanism multiplies the impact of the initial investment by supporting successive generations of farmers without requiring additional grant resources.

The No-Till Adoption Accelerator is managed by a non-profit Micro Credit Organisation (MCO) and operates in close partnership with Conservation Agriculture Teams (CATs), which play a central role in coordinating demand, service delivery and repayment.

Structure of the No-Till Adoption Accelerator

The No-Till Adoption Accelerator consists of two complementary financing windows.

Seasonal Inputs

The seasonal input window finances improved seed, blended fertilisers and other agricultural inputs required for the production cycle.

At the beginning of each agricultural season, CATs aggregate the input requirements of their member farmers and submit consolidated demand to the MCO. Based on this aggregated demand, the MCO procures the required inputs using the No-Till Adoption Accelerator and supplies them to the CATs for onward distribution to participating farmers.

Following harvest, farmers repay the value of the inputs received. CATs coordinate repayment collection and scheduling, significantly reducing transaction costs and improving repayment discipline. Repayments are made formally to the MCO, which records all transactions and manages the No-Till Adoption Accelerator.

Repayments consist of:

- repayment of the principal value of the inputs; and
- a 10% cost-recovery markup, which covers the operational costs

The markup is not intended to generate profit. It finances farmer mobilisation, contract administration, monitoring, advisory support, repayment follow-up, transport, banking charges and applicable taxes. Consistent with the experience of the GIZ IRDP programme, approximately 96% of the markup is used to recover operating costs, while the small remaining balance is retained within the No-Till Adoption Accelerator to strengthen its capital base.

Machinery Window

The machinery window finances conservation agriculture equipment such as tractors, direct seeders, rotary harrow cultivators and field sprayers.

GIZ procures the machinery and transfers it to the MCO that leases it to a CAT while retaining ownership of the assets throughout the repayment period. Rather than leasing machinery directly to individual farmers, the equipment is leased to CATs. CATs then organise and deliver mechanised services to their aggregated smallholder members, allowing farmers to access specialised equipment without having to purchase machinery individually.

CATs repay the machinery investment to the MCO over an agreed repayment period of five years, together with a 2% annual financing charge that contributes towards the administrative costs of managing the machinery portfolio. The financing charge is not intended to generate commercial profit but to support the long-term sustainability of the No-Till Adoption Accelerator. As machinery repayments are received, the MCO reinvests the recovered capital according to a predefined investment plan, allowing the machinery portfolio to replace equipment over time.

Annual Operational Cycle

After GIZ's initial in-kind capitalisation, each annual cycle follows six key steps:

1. CATs aggregate farmers' demand for seasonal inputs and mechanised services.
2. The MCO procures agricultural inputs.
3. Inputs are supplied to farmers through CATs, while machinery is leased to CATs to provide mechanised services to their member farmers.
4. Farmers repay the value of seasonal inputs after harvest, with CATs coordinating repayment scheduling and collection.
5. CATs repay machinery lease obligations to the MCO according to the agreed repayment schedule.
6. The MCO deducts operating costs covered by the markup and financing charge and reinvests residual capital into the next agricultural cycle.

This process allows the initial grant capital to be reused repeatedly.

Financial Model

The accompanying financial model simulates the operation of a single No-Till Adoption Accelerator over a **10-year** period under constant-price assumptions.

The base-case assumptions include:

Parameter	Base case
Projection horizon	10 years
Initial seasonal input capital	EUR 252,000
Initial machinery capital	EUR 228,000
Seasonal input repayment rate	98%
Machinery repayment rate	98%
Input markup	10%
Machinery financing charge	2% per annum
Machinery repayment period	5 years-10 years

The machinery investment plan is based on representative conservation agriculture equipment costs derived from the GIZ IRDP programme, including:

- Tractor (95 HP): **EUR 30,000**
- Direct seeder: **EUR 15,000**
- Rotary harrow cultivator: **EUR 4,000**
- Field sprayer (800 L): **EUR 2,000**

The model incorporates repayment performance, operating cost recovery, machinery reinvestment and No-Till Adoption Accelerator cash flows, as well as sensitivity analysis for alternative repayment scenarios.

Expected Results

The model shows that the instrument is capable of revolving the initial grant capital provided in kind while repeatedly financing new investment cycles over a ten-year period. Starting with an initial capitalisation of EUR 480,000 (EUR 252,000 for seasonal inputs and EUR 228,000 for machinery), the

No-Till Adoption Accelerator finances approximately EUR 2.74 million of cumulative agricultural investments over the projection period, representing a capital revolving multiplier of 5.7 times the initial grant investment.

Despite conservative repayment assumptions of 98% for both seasonal inputs and machinery financing, the No-Till Adoption Accelerator remains financially sustainable throughout the projection period. At the end of Year 10, the fund retains EUR 478,758 in total assets, consisting primarily of cash balances, demonstrating that the original capital has been substantially preserved while financing multiple investment cycles. Cumulative credit losses over the ten-year period amount to approximately EUR 54,800, representing a relatively small proportion of the total capital deployed.

The model also shows the impact generated by the No-Till Adoption Accelerator. In the tenth year alone, the No-Till Adoption Accelerator supports approximately 2,100 hectares under improved agricultural management. Over the ten-year modelling period, the No-Till Adoption Accelerator finances approximately 7,000 farmer production cycles, illustrating how the same grant resources continue to support agricultural production over successive seasons.

The machinery financing window supports eight Conservation Agriculture Teams (CATs), which lease conservation agriculture equipment from the MCO and provide mechanised services to aggregated smallholder farmers within their respective catchment areas. The No-Till Adoption Accelerator reduces transaction costs, improves repayment performance and facilitates access to conservation agriculture technologies for a substantially larger number of farmers than could be reached through direct asset ownership by combining demand aggregation, machinery service provision and repayment coordination through CATs.