Annex 3: Economic and Financial Analysis

This annex must be read in conjunction with the corresponding Excel file.

A. Financial Analysis

Introduction

1. The proposed project has a budget of EUR 78.3 million (GCF grants and co-finance):

    a. Of this, EUR 19.2 million is the GCF grant portion to fund the establishment and operation of the Puna Facility (the "Facility"), which will disburse non-repayable and repayable grants to revenue generating Local initiatives. A full financial analysis of these, showing financial IRRs before and after GCF grant, is presented below, together with a justification for the use of GCF grants.

    b. The remaining portion of the GCF grant (EUR 21.6 million) is for local and national technical assistance and capacity building activities that do not lead directly to financial reflows for beneficiaries. The use of grants for these activities is justifiable on a public-good basis.

    c. Part of the co-finance results in the generation of financial reflows for beneficiaries. This is the case for MIDAGRI grant-funded projects under the Agro Rural, UEFSA and PSI umbrellas and MIDAGRI loan-funded project DSFFA. A detailed financial analysis for these is not presented as they do not entail the use of GCF grants. However, the public investment projects funded by MIDAGRI are broadly consistent with the Local Initiatives funded by the Puna Facility, and therefore the concessionality granted by MIDAGRI is on par with the concessionality granted by GCF.

    d. The remaining portion of co-finance is for technical assistance and capacity building activities that do not directly lead to financial reflows.

2. The exact composition and nature of Local initiatives funded by the Puna Facility will materialize during project implementation. For the purpose of the financial and economic analysis, the project team has simulated business-as-usual (BAU) and climate-resilient (CR) Local initiatives templates in each window. The choice of Local initiatives templates (native potatoes and alpacas in the non-repayable grant window, native potatoes and alpacas in the repayable grant window and alpacas in the Agroideas window) reflects expectations as to the most likely applicants to the Puna Facility. Local initiatives in other agricultural commodities (e.g., Andean grains, eco-tourism) may also be presented to the Facility but will likely constitute a minority of the Local initiatives portfolio or may overlap. For instance, a handful of Local initiatives focused on alpacas or native potatoes may decide to add eco-tourism revenues – for demonstrative purposes, these are included in the FIRR calculations, with returns that are not materially different than alpaca and native potato initiatives without eco-tourism.

3. Assumptions for each of the templates are based on data from technical studies carried out by expert consultants in coordination with the GIZ technical team, who conducted interviews with producers, value chain actors and experts. Additionally, technical data was also sourced

from scientific articles and market analyses carried out with official sources from MIDAGRI's specialized institutions (especially the Integrated Agricultural Statistics System (SIEA), the National Institute for Agricultural Innovation (INIA) and Agroideas). The models developed were validated by MIDAGRI's thematic specialists.

4. The discount rate used for the financial NPV calculations is 11.3%. The vast majority of beneficiaries do not have access to capital and, when they do, it is very expensive and comes at unrealistic terms for the types of investments envisaged by the Puna Facility (high double-digit interest rates charged by MFIs, short maturities even for capex loans, no or very short grace periods, and usually flat instalments that do not match the cashflow profile of the envisaged investments). A WACC calculation that assumes leverage is therefore unrealistic. For the sake of argument, we have added a 100%-equity WACC based on Peru risk-free rates, Peru equity risk premium and farming/agriculture beta estimated by New York University (see top of FIRR sheet in model).

5. A loan scenario has also been modelled, but it is considered unfeasible in the Puna Facility's context (see FIRR sheet, rows in italics). We have assumed a 5-year loan offered by a local financial institution (e.g. MFI) at a 20% interest rate, repaid in 5 equal annual instalments. Such interest rate is on the low side of what MFIs currently offer, and the 5-year maturity is in line with the maturities offered by some MFIs for capex loans. Even if MFIs had concessional funding (e.g. through a GCF loan) they would factor in credit risk and charge commensurately high rates. GCF concessional loans would have to be on-lent to beneficiaries by an accredited financial institution. While the GCF rates would be concessional to the financial institution, the latter would need to apply a mark-up when on-lending to the beneficiaries, to factor in beneficiary credit risk. While beneficiaries are MSMEs and could in principle borrow, in practice they carry a high credit risk as they would be for the most part first-time borrowers, recently formalized and using the proceeds for an investment much larger than they may have experienced in the past. Any financial institution on-lending to the beneficiaries at project onset would therefore charge very high margins on top of the GCF concessional loan rate. We also note that the highly concessional rates (3.5%) offered by the governmental-funded Agroperu fund are de facto not available because that institution is in financial distress. While the FIRR and NPV over 15 years with the modelled loan are attractive for some of the value chains, the major stumbling block is large negative cashflows in early project years and in some cases for a protracted number of years (due to debt repayment). Even if commercial loans were available – and we stress that this is highly hypothetical – such cash shortfalls would make the borrowing solution unfeasible for the Puna Facility beneficiaries.

Puna Facility: Non-Repayable Grant Window

<u>Native Potato Farming</u>

Please refer to "FIRR" sheet in Excel model for results and "Subsistence potatoes" sheet for assumptions.

6. The BAU scenario assumes groups of 30 subsistence farmers producing with traditional practices and selling native potatoes under the following conditions:
   a. Average area farmed of 0.3 hectares
   b. Yield of 7.7 t/ha
   c. An annual decline in yield of 1% due to climate change
   d. Potatoes sold at a low price of S 1.20/kg in local markets

7. In the BAU scenario, the farmer group realizes a net income (positive cashflow) of ~EUR 6,000 in year one, or just EUR 200 per farmer. This very low income is consistent with the situation on the ground. Subsistence farmers and their families are unable to survive on farming only. They complement potato farming with other jobs and receive social benefits. A portion of the crop is also used for self-consumption.

8. The transition to CR farming entails an investment of ~EUR 125,000 over two years, primarily on EBA measures including construction of micro-reservoirs, restauration of terraces and conservation agriculture. In addition, sprinkler irrigation is installed in this scenario and warehouses to store crops are built.

9. CR produces an increase in farm income through 3 avenues primarily:
   a. Increase in yield to 10 t/ha by year 4.
   b. No more yield losses due to climate change
   c. Better access to market, leading to much higher potato prices of S 2.80/kg

10. Absent any grant, the transition from BAU to CR generates a financial IRR of 12.6% over 15 years, which is quite attractive. The NPV is EUR 8,641.

11. Despite the positive FIRR without grants, grants are essential for the transition to CR, for the following reasons:

    a. The beneficiaries live in poverty to the extent of often abandoning the High Puna and moving to urban areas in search of jobs.

    b. Beneficiaries have no savings, and certainly not to the tune of the EUR 125,000 (over EUR 4,000 per farmer in the group) required to implement the transition to CR.

    c. Beneficiaries have limited financial literacy and almost no access to finance. When finance is available, it is offered by micro-finance institutions at prohibitive rates and for short maturities that are unsuitable to the timeline of CR transition (the payback period for the EUR 125,000 investment is approximately 8 years). Lending to CRVC is constrained by several barriers: (i) the inherent high risk of agricultural and livestock activities, exacerbated by climate change; (ii) logistical difficulties in reaching borrowers in the high puna (long distances and remote locations); (iii) limited financial literacy of prospective borrowers; (iv) limited understanding – by both borrowers and lenders – of the climate change impact on high puna economic activities, and how EBA and CRVC can mitigate such impact and improve creditworthiness; and (v) prevalence of informal businesses with limited collateral.

    d. Beneficiaries do not have the knowledge to implement EBA nor the financial resources to pay for technical services provided by private experts in order to gain that knowledge.

12. The Facility overcomes these barriers by providing a non-repayable grant covering 80% of the initial investment cost (with a EUR 100,000 cap), with the remainder provided in-kind (labour) by the beneficiaries. The cash grant in the template Local Initiative amounts to EUR 100,000. In addition, the Facility provides a technical assistance package worth EUR 25,000 to help beneficiaries overcome the knowledge barrier.

13. With the Puna Facility grant and technical assistance, the upfront transition cost from BAU to CR is almost entirely eliminated, resulting in a financial IRR of 121.8% and NPV of EUR

114,396. The initial cash outflow is reduced to ~EUR 6,000, which the 30 farmers are expected to cover using own resources, relying on financial help from families and friends, and increasing their in-kind labour contribution if necessary.

14. Importantly, the initial investment in EBA does not need to be replicated in the future. The only replacement capex is for sprinklers, whose useful life is around 10 years. This will require a future investment of ~EUR 11,000, much smaller than the full EbA capex. The CR net income in steady state is over EUR 31,000 for the farmer group, a 6-fold increase. This provides a powerful financial incentive for beneficiaries to continue in the implementation of CR practices even after the expiry of the GCF project.

Year (EUR)	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Subsistence window -- native potatoes																
Business-as-usual (BAU)																
Revenues		20,871	20,662	20,456	20,251	20,049	19,848	19,650	19,453	19,259	19,066	18,875	18,687	18,500	18,315	18,132
Capex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Opex (excl. in-kind labor)		(14,861)	(14,712)	(14,565)	(14,419)	(14,275)	(14,132)	(13,991)	(13,851)	(13,713)	(13,576)	(13,440)	(13,305)	(13,172)	(13,041)	(12,910)
Net cashflows		6,010	5,950	5,891	5,832	5,773	5,716	5,658	5,602	5,546	5,490	5,436	5,381	5,327	5,274	5,221
FIRR		#NUM!														
Climate-resilient (CR)																
Revenues		20,871	31,403	41,936	52,468	63,000	63,000	63,000	63,000	63,000	63,000	63,000	63,000	63,000	63,000	63,000
Capex	(136,651)	(62,706)	(62,506)	0	0	0	0	0	0	0	0	(11,438)	0	0	0	0
Opex (excl. in-kind labor)		(18,276)	(22,187)	(28,664)	(30,091)	(31,518)	(31,518)	(31,518)	(31,518)	(31,518)	(31,518)	(31,518)	(31,518)	(31,518)	(31,518)	(31,518)
Net cashflows		(60,111)	(53,290)	13,272	22,377	31,482	31,482	31,482	31,482	31,482	31,482	20,043	31,482	31,482	31,482	31,482
FIRR		18.9%														
FIRR without grant																
Incremental cashflows		(66,121)	(59,240)	7,381	16,545	25,709	25,766	25,823	25,880	25,936	25,991	14,608	26,101	26,155	26,208	26,261
FIRR without grant		**12.6%**														
NPV without grant		**8,641**														
FIRR with grant																
Grant as % of incremental CR capex		80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Grant	100,000	50,165	49,835	0	0	0	0	0	0	0	0	0	0	0	0	0
TA provided by project	25,000	10,000	10,000	2,500	2,500	0	0	0	0	0	0	0	0	0	0	0
Incremental cashflows		(5,956)	595	9,881	19,045	25,709	25,766	25,823	25,880	25,936	25,991	14,608	26,101	26,155	26,208	26,261
FIRR with grant		**121.8%**														
NPV with grant		**114,396**														
FIRR with loan																
Incremental cashflows		*(66,121)*	*(59,240)*	*7,381*	*16,545*	*25,709*	*25,766*	*25,823*	*25,880*	*25,936*	*25,991*	*14,608*	*26,101*	*26,155*	*26,208*	*26,261*
Loan drawdown	*125,000*	*66,121*	*58,879*													
Loan repayments				*(41,797)*	*(41,797)*	*(41,797)*	*(41,797)*	*(41,797)*								
Net cashflows		*0*	*(361)*	*(34,416)*	*(25,252)*	*(16,089)*	*(16,031)*	*(15,974)*	*25,880*	*25,936*	*25,991*	*14,608*	*26,101*	*26,155*	*26,208*	*26,261*
FIRR with loan		***9.2%***														
NPV with loan		***(8,066)***														

Alpaca Production

Please refer to "FIRR" sheet in excel model for results and "Subsistence alpacas" sheet for assumptions.

15. The BAU scenario assumes groups of 15 subsistence alpaca breeders producing with traditional practices and selling alpaca products under the following conditions:
    a. Small ratio of alpaca bred per hectares of grassland, due to deteriorated ecosystem (0.17 alpaca/ha in native grasslands, 0.33 in managed grasslands)
    b. 3% of alpaca fiber lost in the field, 3% lost in sorting and 10% not meeting market standards
    c. Revenues generated from the sale of:
        i. Unsorted fiber at a low price of S 26/kg
        ii. Handicrafts
        iii. Meat at a low price of S 8/kg, with ~10% of alpacas slaughtered

16. In the BAU scenario, the group realizes a net income (positive cashflow) of ~EUR 4,100 in year one, or just EUR ~270 per farmer. This very low income is consistent with the situation

on the ground. Subsistence breeders and their families are unable to survive on alpaca breeding only. They complement this activity with other jobs and receive social benefits. A portion of the meat is also used for self-consumption.

17. The transition to CR farming entails an investment of ~EUR 139,000 over two years, primarily on EBA measures including construction of micro-reservoirs, reforestation with native species, construction of infiltration trenches and restauration of natural grassland. In addition, cultivated pastures and related greenhouses are built.

18. CR produces an increase in farm income through several avenues:
    a. Increase in alpaca density to 0.33 alpaca/ha in native grasslands and 1 alpaca/ha in managed grassland
    b. Gradual decrease in alpaca fiber lost in the field to 2%, lost in sorting to 2% and not meeting market standards to 5%
    c. Two additional revenue streams, namely the sale of sorted alpaca fiber at a higher price of S 31/kg and sale of washed, carded and combed fiber at a high price of S 60/kg
    d. Increase in meat revenues by increasing the percentage of alpacas slaughtered gradually to 35% by year 15, and higher meat prices due to higher quality (S 12/kg)

19. Absent any grant, the transition from BAU to CR generates a financial IRR of 8.4% over 15 years, which is relatively attractive but below WACC, resulting in an NPV of EUR -21,888.

20. Despite the positive FIRR without grants, grants are essential for the transition to CR, for reasons similar to those in the native potato scenario: poverty, very low savings, limited financial literacy and access to finance, lack of EbA/CR knowledge. Without grant, beneficiaries would face a 3-year period of negative cashflows. It would take 7 subsequent years of positive cashflows to offset the gap in the first three years.

21. The Facility overcomes these barriers by providing a non-repayable grant covering 80% of the initial investment cost (with a EUR 100,000 cap), with the remainder provided in-kind (labor) by the beneficiaries. The cash grant in the template Local Initiative amounts to EUR 100,000 (cap hit). In addition, the Facility provides a technical assistance package worth EUR 25,000 to help beneficiaries overcome the knowledge barrier.

22. With the Puna Facility grant and technical assistance, the upfront transition cost from BAU to CR is significantly reduced, resulting in a financial IRR of 63.7% and NPV of EUR 84,122. The initial cash outflow is reduced to ~EUR 12,000, which the 15 breeders are expected to cover using own resources, relying on financial help from families and friends and increasing their in-kind labor contribution if necessary.

23. Importantly, the initial investment in EbA does not need to be replicated in the future. The only replacement capex is for greenhouses, whose useful life is around 10 years. This will require a future investment of ~EUR 49,500 spread over two years, much smaller than the full EBA capex. By that time, the annual CR net income for the group will be over EUR 30,000 (~8-fold increase vs. BAU) and still growing. Group members will have reached a level of financial preparedness, income and creditworthiness that should enable them to borrow for this additional investment, in addition to tapping into any savings accumulated. The enhanced income generation of CR practices provides a powerful financial incentive for beneficiaries to continue in the implementation of CR even after the expiry of the GCF project.

Year (EUR)	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Subsistence window -- alpacas																
Business-as-usual (BAU)																
Revenues		8,026	7,632	7,256	6,885	6,525	6,170	5,826	5,486	5,157	4,833	4,520	4,219	3,922	3,629	3,355
Capex		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Opex (excl. in-kind labor)		(3,928)	(3,745)	(3,572)	(3,400)	(3,233)	(3,067)	(2,906)	(2,746)	(2,591)	(2,437)	(2,288)	(2,145)	(2,002)	(1,860)	(1,728)
Net cashflows		4,098	3,887	3,684	3,485	3,292	3,103	2,919	2,740	2,566	2,396	2,232	2,074	1,920	1,769	1,627
FIRR		#NUM!														
Climate-resilient (CR)																
Revenues		8,026	10,689	17,884	22,822	28,803	34,292	38,977	43,278	45,317	47,349	49,394	51,442	53,493	55,548	57,605
Capex	(188,506)	(66,190)	(66,190)	(6,625)	0	0	0	0	0	0	0	(24,750)	(24,750)	0	0	0
Opex (excl. in-kind labor)		(3,928)	(5,470)	(11,373)	(12,208)	(13,103)	(13,927)	(14,456)	(14,976)	(15,118)	(15,254)	(15,396)	(15,537)	(15,679)	(15,820)	(15,962)
Net cashflows		(62,092)	(60,971)	(114)	10,614	15,700	20,365	24,521	28,302	30,199	32,095	9,248	11,155	37,815	39,727	41,643
FIRR		11.4%														
FIRR without grant																
Incremental cashflows		(66,190)	(64,858)	(3,798)	7,129	12,408	17,262	21,602	25,562	27,633	29,699	7,016	9,081	35,895	37,958	40,016
FIRR without grant		**8.4%**														
NPV without grant		**(21,888)**														
FIRR with grant																
Grant as % of incremental CR capex		80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Grant	100,000	52,952	47,048	0	0	0	0	0	0	0	0	0	0	0	0	0
TA provided by project	25,000	10,000	10,000	2,500	2,500	0	0	0	0	0	0	0	0	0	0	0
Incremental cashflows		(3,238)	(7,810)	(1,298)	9,629	12,408	17,262	21,602	25,562	27,633	29,699	7,016	9,081	35,895	37,958	40,016
FIRR with grant		**63.7%**														
NPV with grant		**84,122**														
FIRR with loan																
Incremental cashflows		*(66,190)*	*(64,858)*	*(3,798)*	*7,129*	*12,408*	*17,262*	*21,602*	*25,562*	*27,633*	*29,699*	*7,016*	*9,081*	*35,895*	*37,958*	*40,016*
Loan drawdown	*125,000*	*66,190*	*58,810*													
Loan repayments				*(41,797)*	*(41,797)*	*(41,797)*	*(41,797)*	*(41,797)*								
Net cashflows		*0*	*(6,048)*	*(45,596)*	*(34,668)*	*(29,390)*	*(24,535)*	*(20,196)*	*25,562*	*27,633*	*29,699*	*7,016*	*9,081*	*35,895*	*37,958*	*40,016*
FIRR with loan		***3.9%***														
NPV with loan		***(38,589)***														

Puna Facility: Results-based Repayable Grant Window

Native Potato Farming

Please refer to "FIRR" sheet in excel model for results and "Repayable potatoes" sheet for assumptions.

24. The BAU scenario is the same as in the non-repayable window, with the exception of larger farm size (0.85 hectares)

25. In the BAU scenario, the farmer group realizes a net income (positive cashflow) of ~EUR 10,000 in year one, or ~EUR 330 per farmer. This very low income is consistent with the situation on the ground. Farmers and their families are unable to survive on farming only. They complement potato farming with other jobs and receive social benefits. A portion of the crop is also used for self-consumption.

26. The CR scenario is more ambitious than in the non-repayable window. The CR transition entails an investment of ~EUR 257,000 over four years (the vast majority occurring over the first two years), primarily on EBA measures including construction of rustic micro-reservoirs (locally called family qochas[1]), restauration of terraces and conservation agriculture. In addition, sprinkler irrigation is installed in this scenario and warehouses to store crops are built.

27. CR produces an increase in farm income through 3 avenues primarily:
    a. Increase in yield to 10 t/ha by year 4

[1] *Qochas* are reservoirs in natural depressions or lagoons of pre-Inca origin (Moran et al., 2018;). They can be natural or man-made, but both are beneficial for rainwater storage purposes, particularly in the dry months.

b. No more yield losses due to climate change
c. Better access to market, leading to much higher potato prices of S 2.80/kg

28. Absent any grant, the transition from BAU to CR generates a financial IRR of 25.8% over 15 years and an NPV of EUR 209,684, which is attractive.

29. Despite the positive FIRR without grants, grants are essential for the transition to CR, for the following reasons:

    a. The beneficiaries, while not as poor as those in the subsistence window, do live in poverty to the extent of often abandoning the High Puna and moving to urban areas in search of jobs.

    b. Beneficiaries have limited savings, but certainly not to the tune of the EUR 257,000 (over EUR 8,500 per farmer in the group) required to implement the transition to CR.

    c. Beneficiaries have limited financial literacy and almost no access to finance. When finance is available, it is offered by micro-finance institutions at prohibitive rates, for smaller amounts and for short maturities that are unsuitable to the timeline of CR transition (the payback period for the EUR 257,000 investment is approximately 4 years).

    d. Beneficiaries do not have the knowledge to implement EBA and have limited financial resources to pay for technical services provided by private experts in order to gain that knowledge.

    e. Considering the attractiveness of the business model over the long term, however, non-repayable grants would be too concessional. A repayable grant is therefore introduced, with the benefits that (i) beneficiaries start building a track record in managing repayments that enhances their future bankability with MFIs and other financial institutions and (ii) repaid amounts flow back into the Facility, which will use it to support additional future Local initiatives.

30. The repayable grant covers 80% of the initial investment cost (with a EUR 200,000 cap), with the remainder provided in-kind (labour) by the beneficiaries. The cash grant in the template Local Initiative amounts to EUR 200,000 (cap hit). In addition, the Facility provides a technical assistance package worth EUR 25,000 to help beneficiaries overcome the knowledge barrier.

31. With the Puna Facility grant and technical assistance, the upfront transition cost from BAU to CR is substantially reduced, resulting in a financial IRR of 84.3% and an NPV of EUR 280,563. The initial cash outflow is reduced to ~EUR 17,600, which the 30 farmers are expected to cover using own resources, relying on financial help from families and friends, and increasing their in-kind labour contribution if necessary. Grant repayment in this example would take place in the 4 years after the last disbursement and would still allow for positive cashflows post-repayment.

32. Importantly, the initial investment in EbA does not need to be replicated in the future. The only replacement capex is for sprinklers, whose useful life is around 10 years. This will require a future investment of ~EUR 32,000, much smaller than the full EbA capex. The CR net income in steady state is ~EUR 95,000 for the farmer group, a ~9-fold increase. This provides a powerful financial incentive for beneficiaries to continue in the implementation of CR practices even after the expiry of the GCF project. By the time replacement capex is needed,

beneficiaries of repayable grants are also expected to have graduated to full commercial bankability.

Year (EUR)	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Repayable window -- native potatoes																
Business-as-usual (BAU)																
Revenues		59,135	58,543	57,958	57,378	56,804	56,236	55,674	55,117	54,566	54,020	53,480	52,945	52,416	51,892	51,373
Capex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Opex (excl. in-kind labor)		(49,123)	(48,632)	(48,146)	(47,664)	(47,188)	(46,716)	(46,249)	(45,786)	(45,328)	(44,875)	(44,426)	(43,982)	(43,542)	(43,107)	(42,676)
Net cashflows		10,011	9,911	9,812	9,714	9,617	9,521	9,425	9,331	9,238	9,145	9,054	8,963	8,874	8,785	8,697
FIRR		#NUM!														
Climate-resilient (CR)																
Revenues		59,135	88,976	118,817	178,500	178,500	178,500	178,500	178,500	178,500	178,500	178,500	178,500	178,500	178,500	178,500
Capex	(289,441)	(125,366)	(125,166)	(3,250)	(3,250)	0	0	0	0	0	0	(32,409)	0	0	0	0
Opex (excl. in-kind labor)		(51,673)	(62,050)	(74,220)	(79,989)	(83,023)	(83,023)	(83,023)	(83,023)	(83,023)	(83,023)	(83,023)	(83,023)	(83,023)	(83,023)	(83,023)
Net cashflows		(117,905)	(98,240)	41,347	95,261	95,477	95,477	95,477	95,477	95,477	95,477	63,068	95,477	95,477	95,477	95,477
FIRR		31.2%														
FIRR without grant																
Incremental cashflows		(127,916)	(108,151)	31,535	85,547	85,860	85,956	86,052	86,146	86,239	86,332	54,014	86,514	86,603	86,692	86,780
FIRR without grant		**25.8%**														
NPV without grant		**209,684**														
FIRR with grant																
Grant as % of incremental CR capex		80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Grant	200,000	100,293	99,707	0	0	0	0	0	0	0	0	0	0	0	0	0
Grant repayment	(200,000)	0	0	(20,000)	(60,000)	(60,000)	(60,000)	0	0	0	0	0	0	0	0	0
TA provided by project	25,000	10,000	10,000	2,500	2,500	0	0	0	0	0	0	0	0	0	0	0
Incremental cashflows		(17,623)	1,556	14,035	28,047	25,860	25,956	86,052	86,146	86,239	86,332	54,014	86,514	86,603	86,692	86,780
FIRR with grant		**84.3%**														
NPV with grant		**280,563**														
FIRR with loan																
Incremental cashflows		*(127,916)*	*(108,151)*	*31,535*	*85,547*	*85,860*	*85,956*	*86,052*	*86,146*	*86,239*	*86,332*	*54,014*	*86,514*	*86,603*	*86,692*	*86,780*
Loan drawdown	*225,000*	*127,916*	*97,084*													
Loan repayments				*(75,235)*	*(75,235)*	*(75,235)*	*(75,235)*	*(75,235)*								
Net cashflows		*0*	*(11,068)*	*(43,701)*	*10,312*	*10,625*	*10,721*	*10,816*	*86,146*	*86,239*	*86,332*	*54,014*	*86,514*	*86,603*	*86,692*	*86,780*
FIRR with loan		***44.1%***														
NPV with loan		***180,425***														

33. In the model an overlapping scenario of native potatoes + eco-tourism is presented (FIRR sheet, rows 125-161), although this is likely to be a very rare occurrence in the Puna Facility portfolio. As can be seen in the model, the overall conclusions in terms of FIRR and NPV with and without grant remain broadly the same.

Alpaca Production

Please refer to "FIRR" sheet in excel model for results and "Repayable alpacas" sheet for assumptions.

34. The BAU scenario is the same as in the non-repayable window, except the alpaca "density", which is higher (0.33 alpaca/ha in native grasslands, 1 alpaca in managed grasslands).

35. In the BAU scenario, the group realizes a net income (positive cashflow) of ~EUR 7,300 in year one, or just EUR ~490 per farmer. This very low income is consistent with the situation on the ground. Breeders and their families are unable to survive on alpaca breeding only. They complement this activity with other jobs and receive social benefits. A portion of the meat is also used for self-consumption.

36. The transition to CR farming entails a substantial investment of ~EUR 283,000 over four years (large majority in the first two years), primarily on EbA measures including construction of micro-reservoirs, reforestation with native species, construction of infiltration trenches and restauration of natural grassland. In addition, cultivated pastures and related greenhouses are built.

37. CR produces an increase in farm income through several avenues:

a. Increase in alpaca density to 1 alpaca/ha in native grasslands
b. An increase in the percentages of alpacas sheared and those slaughtered
c. Gradual decrease in alpaca fiber lost in the field to 2%, lost in sorting to 2% and not meeting market standards to 5%
d. Two additional revenue streams, namely the sale of sorted alpaca fiber at a higher price of S 31/kg and sale of washed, carded and combed fiber at a high price of S 74/kg (higher than in the subsistence window due to greater production volumes and negotiating power)

38. Absent any grant, the transition from BAU to CR generates a financial IRR of 17.1% and NPV of EUR 98,771 over 15 years, which is attractive.

39. Despite the positive FIRR without grants, repayable grants are essential for the transition to CR, for reasons similar to those in the native potato scenario: poverty, low savings, limited financial literacy and access to finance, lack of EbA/CR knowledge. Without grant, beneficiaries would face a 3-year period of negative cashflows (very negative in the first two). It would take 5 subsequent years of positive cashflows to offset the gap in the first three years.

40. The repayable grant covers 80% of the initial investment cost (with a EUR 200,000 cap), with the remainder provided in-kind (labour) by the beneficiaries. The cash grant in the template Local Initiative amounts to EUR 200,000 (cap hit). In addition, the Facility provides a technical assistance package worth EUR 25,000 to help beneficiaries overcome the knowledge barrier.

41. With the Puna Facility grant and technical assistance, the upfront transition cost from BAU to CR is substantially reduced, resulting in a financial IRR of 48.1% and NPV of EUR 191,577. The initial cash outflow is reduced to ~EUR 25,000 over two years, which the beneficiaries are expected to cover using own resources, relying on financial help from families and friends, and increasing their in-kind labour contribution if necessary. Grant repayment in this example would take place in the 5 years after the last disbursement and would still allow for positive cashflows post-repayment.

42. Importantly, the initial investment in EbA does not need to be replicated in the future. The only replacement capex is for greenhouses, whose useful life is around 10 years. This will require a future investment of ~EUR 110,000, smaller than the full EBA capex. The CR net income in steady state is ~EUR 107,000 for the farmer group, a 15-fold increase. This provides a powerful financial incentive for beneficiaries to continue in the implementation of CR practices even after the expiry of the GCF project. By the time replacement capex is needed, beneficiaries of repayable grants are also expected to have graduated to full commercial bankability.

Year (EUR)	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Repayable window -- alpacas																
Business-as-usual (BAU)																
Revenues		16,052	15,271	14,520	13,778	13,051	12,340	11,652	10,972	10,315	9,674	9,048	8,439	7,844	7,266	6,711
Capex		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Opex (excl. in-kind labor)		(8,766)	(8,374)	(7,999)	(7,624)	(7,255)	(6,892)	(6,541)	(6,190)	(5,850)	(5,516)	(5,189)	(4,867)	(4,551)	(4,241)	(3,942)
Net cashflows		7,287	6,897	6,522	6,154	5,796	5,447	5,111	4,782	4,465	4,157	3,860	3,572	3,294	3,025	2,769
FIRR		#NUM!														
Climate-resilient (CR)																
Revenues		16,052	23,512	44,647	58,309	75,005	90,935	104,789	140,550	140,622	140,693	140,764	140,836	140,907	140,979	141,050
Capex	(393,330)	(123,665)	(123,665)	(18,000)	(18,000)	0	0	0	0	0	0	(55,000)	(55,000)	0	0	0
Opex (excl. in-kind labor)		(8,766)	(12,407)	(22,363)	(24,744)	(27,347)	(29,847)	(31,667)	(33,486)	(33,486)	(33,486)	(33,486)	(33,486)	(33,486)	(33,486)	(33,486)
Net cashflows		(116,378)	(112,560)	4,284	15,564	47,657	61,088	73,122	107,065	107,136	107,208	52,279	52,350	107,422	107,493	107,564
FIRR		19.6%														
FIRR without grant																
Incremental cashflows		(123,665)	(119,457)	(2,238)	9,410	41,862	55,641	68,012	102,283	102,672	103,050	48,419	48,778	104,128	104,468	104,795
FIRR without grant		**17.1%**														
NPV without grant		**98,771**														
FIRR with grant																
Grant as % of incremental CR capex		80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Grant	200,000	98,932	98,932	2,136	0	0	0	0	0	0	0	0	0	0	0	0
Grant repayment	(200,000)	0	0	0	(5,000)	(30,000)	(45,000)	(55,000)	(65,000)	0	0	0	0	0	0	0
TA provided by project	25,000	10,000	10,000	2,500	2,500	0	0	0	0	0	0	0	0	0	0	0
Incremental cashflows		(14,733)	(10,525)	2,398	6,910	11,862	10,641	13,012	37,283	102,672	103,050	48,419	48,778	104,128	104,468	104,795
FIRR with grant		**48.1%**														
NPV with grant		**191,577**														
FIRR with loan																
Incremental cashflows		*(123,665)*	*(119,457)*	*(2,238)*	*9,410*	*41,862*	*55,641*	*68,012*	*102,283*	*102,672*	*103,050*	*48,419*	*48,778*	*104,128*	*104,468*	*104,795*
Loan drawdown	*225,000*	*123,665*	*101,335*													
Loan repayments				*(75,235)*	*(75,235)*	*(75,235)*	*(75,235)*	*(75,235)*								
Net cashflows		*0*	*(18,122)*	*(77,473)*	*(65,825)*	*(33,374)*	*(19,595)*	*(7,224)*	*102,283*	*102,672*	*103,050*	*48,419*	*48,778*	*104,128*	*104,468*	*104,795*
FIRR with loan		***17.6%***														
NPV with loan		***69,123***														

43. In the model an overlapping scenario of alpacas + eco-tourism is presented (FIRR sheet, rows 201-237), although this is likely to be a very rare occurrence in the Puna Facility portfolio. As can be seen in the model, the overall conclusions in terms of FIRR and NPV with and without grant remain broadly the same.

Puna Facility: Agroideas Window

<u>Alpaca Production</u>

Please refer to "FIRR" sheet in excel model for results and "Agroideas alpacas" sheet for assumptions.

44. The BAU scenario is an upscaled version of that in the repayable window. The group of alpaqueros controls 50% more land in this scenario, which supports a 50% higher number of alpacas.

45. The transition to CR farming entails a very substantial investment of ~EUR 245,000 over four years. Of this, the largest portion is in value chain investments that are eligible for Agroideas grants, such as construction of greenhouses, cultivated pastures and alpaca shearing equipment. A smaller portion of ~EUR 90,000 is in EbA measures including construction of micro-reservoirs, reforestation with native species, construction of infiltration trenches and restauration of natural grassland. In addition, cultivated pastures and related greenhouses are built.

46. CR produces an increase in farm income through several avenues:
    a. Increase in alpaca density to 1 alpaca/ha in native grasslands
    b. An increase in the percentages of alpacas sheared and those slaughtered
    c. Gradual decrease in alpaca fiber lost in the field to 2%, lost in sorting to 2% and not meeting market standards to 5%

d. Two additional revenue streams, namely the sale of sorted alpaca fiber at a higher price of S 31/kg and sale of washed, carded and combed fiber at a high price of S 74/kg (higher than in the subsistence window due to greater production volumes and negotiating power)

47. Absent any grant from either Agroideas or the Puna Facility, the transition from BAU to CR generates a financial IRR of 19.5% and NPV of EUR 106,971 over 15 years, which is attractive. The cash shortfall in the first four years, however, would be significant due to the large scale of the investment. Four subsequent years of positive cashflows would be needed to just recover the investment.

48. Agroideas grants equal to 80% of the value chain capex would cover some EUR 124,000 out of the total investment required, leaving beneficiaries exposed to a still significant cash shortfall. As noted above, beneficiaries are vulnerable, have limited savings and limited access to finance – although their situation is better than the subsistence beneficiaries. If available, loan terms offered by MFIs are inadequate, with short maturities and high interest rates.

49. The Puna Facility repayable grant is meant to reduce this funding shortfall in the investment years, which would otherwise deter applicants from presenting projects to Agroideas. The repayable grant would cover solely the EbA investment portion, which directly addresses climate change barriers and, by dint of its repayable feature, inherently minimizes concessionality and allows for future “recycling” of Puna Facility funds into additional Local Initiatives. The repayable grant covers 80% of the initial EbA investment cost (with a EUR 75,000 cap), with the remainder provided in-kind (labour) by the beneficiaries. The Puna Facility repayable grant in this template Local Initiative would amounts to EUR 72,000 (slightly below cap). In addition, the Facility provides a technical assistance package worth EUR 12,500 to help beneficiaries overcome the knowledge barrier.

50. With the Agroideas and Puna Facility grants and technical assistance, the upfront transition cost from BAU to CR is substantially reduced, resulting in a financial IRR of 56.8% and NPV of EUR 226,899. The initial cash outflow is reduced to ~EUR 31,000 over two years (~EUR 1,000 per alpaquero in the group), which the beneficiaries are expected to cover using own resources, relying on financial help from families and friends, and perhaps borrowing a portion of the amount if they have personal collateral.

51. Importantly, the initial investment in EbA does not need to be replicated in the future. The only replacement capex is for greenhouses, whose useful life is around 10 years. This will require a future investment of ~EUR 104,000. The CR net income at point will be in excess of EUR 90,000, a 10-fold increase. This provides a powerful financial incentive for beneficiaries to continue in the implementation of CR practices even after the expiry of the GCF project. By the time replacement capex is needed, beneficiaries of are also expected to have graduated to full commercial bankability.

Year (EUR)	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Agroideas Matchmaking Sub-Window -- alpacas																
Business-as-usual (BAU)																
Revenues		24,079	22,910	21,777	20,663	19,576	18,517	17,477	16,465	15,480	14,514	13,576	12,658	11,774	10,903	10,066
Capex	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Opex (excl. in-kind labor)		(14,743)	(15,826)	(15,101)	(14,385)	(13,684)	(12,997)	(12,320)	(11,658)	(11,010)	(10,372)	(9,749)	(9,135)	(8,541)	(7,951)	(7,381)
Net cashflows		9,335	7,084	6,676	6,278	5,893	5,520	5,157	4,807	4,470	4,142	3,828	3,523	3,234	2,952	2,685
FIRR		#NUM!														
Climate-resilient (CR)																
Revenues		24,079	30,981	53,349	66,348	81,903	95,802	107,029	117,185	123,018	128,859	134,708	138,533	142,366	146,206	150,054
Capex for CRVC	(259,144)	(51,548)	(51,548)	(51,548)	0	0	0	0	0	0	0	(52,250)	(52,250)	0	0	0
Capex for EBA	(89,963)	0	0	(44,981)	(44,981)	0	0	0	0	0	0	0	0	0	0	0
Opex (excl. in-kind labor)		(22,512)	(26,558)	(28,517)	(30,622)	(32,894)	(34,957)	(36,226)	(37,493)	(38,015)	(38,538)	(39,060)	(39,060)	(39,060)	(39,060)	(39,060)
Net cashflows		(49,982)	(47,125)	(71,698)	(9,255)	49,009	60,846	70,802	79,692	85,003	90,322	43,398	47,223	103,306	107,146	110,994
FIRR		23.5%														
FIRR without grant																
Incremental cashflows		(59,317)	(54,209)	(78,373)	(15,533)	43,116	55,326	65,645	74,884	80,533	86,179	39,570	43,700	100,073	104,195	108,310
FIRR without grant		**19.5%**														
NPV without grant		**106,971**														
FIRR with grant																
Agroideas grant as % of CRVC capex		80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Agroideas grant	123,715	41,238	41,238	41,238	0	0	0	0	0	0	0	0	0	0	0	0
PF grant as % of EBA capex		80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
PF grant	71,970	0	0	35,985	35,985	0	0	0	0	0	0	0	0	0	0	0
PF grant repayment	(71,970)	0	0	0	0	(25,000)	(25,000)	(21,970)	0	0	0	0	0	0	0	0
PF TA	12,500	0	0	5,000	5,000	2,500	0	0	0	0	0	0	0	0	0	0
Incremental cashflows		(18,079)	(12,970)	3,850	25,452	20,616	30,326	43,675	74,884	80,533	86,179	39,570	43,700	100,073	104,195	108,310
FIRR with grant		**56.8%**														
NPV with grant		**226,899**														
FIRR with loan																
Incremental cashflows		*(59,317)*	*(54,209)*	*(78,373)*	*(15,533)*	*43,116*	*55,326*	*65,645*	*74,884*	*80,533*	*86,179*	*39,570*	*43,700*	*100,073*	*104,195*	*108,310*
Agroideas grant	123,715	*41,238*	*41,238*	*41,238*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Loan drawdown	84,470			*42,235*	*42,235*											
Loan repayments						*(28,245)*	*(28,245)*	*(28,245)*	*(28,245)*	*(28,245)*						
Net cashflows		*(18,079)*	*(12,970)*	*5,100*	*26,702*	*14,871*	*27,081*	*37,400*	*46,639*	*52,288*	*86,179*	*39,570*	*43,700*	*100,073*	*104,195*	*108,310*
FIRR with loan		***53.2%***														
NPV with loan		***197,879***														

B. Economic Analysis

Please refer to "EIRR" sheet in Excel model for assumptions and results.

52. The economic analysis evaluates the economic benefits of the GCF project vs. the overall project cost (GCF grant and co-finance). The quantifiable benefits arising from the project are: (i) carbon sequestration, (ii) increased income for the beneficiaries of Puna Facility Local Initiatives during the GCF project period, (iii) positive water management impact on downstream Puna Facility beneficiaries, (iv) increased income and carbon sequestration from future local initiatives funded with repaid grants, and (v) the economic benefits of projects funded with MIDAGRI co-finance. Below is a detailed discussion.

53. The economic NPV is based on a social discount rate of 6%. This rate is at the upper end of the World Bank estimate of social discount rate in 9 Latin American countries (incl. Peru), which is 3.5-4% if long-term economic growth expectations are low and 5-6% is growth expectations are more optimistic. This rate is also above the Peru Ministry of Economy and Finance (MEF) estimate of 4%.[2] Additional sources corroborate the choice of this discount rate, including:

    a. In 2016, the Peruvian government reorganised the National Public Investment System, called it Invierte.pe[3]. The new system includes more advanced concepts such as the consideration of natural infrastructure as a capital that requires public investment to conserve and recover ecosystems and their services. The current parameters used

[2] MEF (November 2011). *Cálculo de la Tasa Social de Descuento para Proyectos de Inversión Pública Ambientales*. Calculo_TSD_PIP_Ambientales_Noviembre_2011.pdf (mef.gob.pe)
[3] Acerca de Invierte.pe (mef.gob.pe)

for the social assessment of projects, along with the methodologies used to calculate them in this system, are published on the website of the Peruvian Ministry of Economy and Finance, which is also the NDA to the GCF, at Social Assessment Parameters[4] (mef.gob.pe). Annex Nº 11 (mef.gob.pe)[5] specifies that the discount rate is 8%, which is used for all public investment projects in general. However, this same directive indicates the correction factors that reduce the cost of the projects considerably. For example, for labour, correction factors are used because of the coexistence of a certain level of formality with a high level of underemployment, with factors for the Andes ranging from 0.42 for unskilled labor to 0.79 for skilled labor. There are also other correction factors for fuel, transport, etc. Taking these correction factors into account, the adjusted discount rate would be around 6%.

b. Also, in this same directive for long-term projects a rate of 5.5% is suggested[6]. Also, according to the Peru: Country Climate and Development Report by the World Bank [7](2022) (page 64-66): for Peru's adaptation and mitigation investment needs by 2030 and 2050, "Costs are NPV at a discount rate of 6%. The benefits in transport and energy correspond to savings in operating costs; in forestry, to the added value of production; and in water, to improvements in efficiency and reduced damage from droughts and floods.

Carbon Sequestration

54. The project is expected to reduce GHG emissions by 407,657 tCOe over 15 years. Emission reductions will start in year 3, when the first Local Initiatives approved by the Puna Facility start implementation. The overall timeframe of the economic analysis has therefore been extended to 17 years.

55. The base case assumption chosen for shadow price of carbon is EUR 60/tCO2eq. The OECD has published a study on the effective carbon prices needed to meet the Paris Agreement's goal of limiting global temperature increases to 1.5°C by mid-century.[8] Based on a comprehensive review of studies by academic and policy institutions, the OECD has selected EUR 60 as its mid-range estimate of required carbon prices. The OECD's low-end estimate is EUR 30 while its high-end estimate is EUR 120. To put the OECD's mid-range estimate in context:

    a. The High-Level Commission on Carbon Prices estimated that carbon prices at a level of EUR 40-80 were needed in 2020 for countries to decarbonize in line with the Paris Agreement. In 2030, prices should reach EUR 50-100.[9]

[4] https://www.mef.gob.pe/es/?option=com_content&language=es-ES&Itemid=101376&lang=es-ES&view=article&id=5690
[5] ANEXO Nº 11 (mef.gob.pe)
[6] According to the General Guide for the Identification, Formulation and Evaluation of Investment Projects, long-term projects are considered to be those that have high investment costs in the present, but positively affect future generations, as is the case of this project. This rate benefits projects that aim to mitigate greenhouse gas emissions, reduce the effects of climate change, biodiversity loss, the decline in the stock of biological resources, the management of environmental liabilities, pollution in general, among others, as they imply the need to make investments whose effects will be felt in the future.
[7] Perú - Informe sobre Clima y Desarrollo de los Países (worldbank.org)
[8] OECD (5 May 2021). *Effective Carbon Rates 2021 – Pricing Carbon Emissions through Taxes and Emissions Trading*. Link: https://www.oecd-ilibrary.org/taxation/effective-carbon-rates-2021_0e8e24f5-en
[9] Ibid.

b. The IMF recommends an increase in carbon prices by EUR 75 from current levels through 2030 in a scenario that assumes optimal support for clean technology development.[10]

c. Emission allowances in the EU Emission Trading Scheme, the world's largest, stood at approximately EUR 80 as of November 2023.[11]

d. The OECD's mid-range estimate therefore appears reasonable and in fact even conservative in light of EU market prices.

Economic Benefits of Puna Facility Local Initiatives Funded during GCF Period

56. Economic benefits are estimated multiplying the net cashflows over 15 years of each Local Initiative by the indicative number of Local Initiatives that the Puna Facility could fund over the GCF project period. Calls for proposals are expected to start in year 3 – the previous two years being dedicated to preparatory activities. The net cashflows of each Local Initiative over 15 years are those presented in the financial analysis (incremental cashflows of CR vs. BAU, without GCF grant since the latter is already included in the GCF project budget).

57. The composition of the Local Initiative portfolio is indicative and may vary during implementation. The table below summarizes the Local Initiative portfolio by Local Initiative type and number of Local Initiatives approved in each call for proposals:

	Number of Local Initiatives approved			
Type	CfP 1	CfP 2	CfP 3	Total
Non-repayable wind. – potatoes	3	14	13	30
Non-repayable wind. – alpacas	5	20	20	45
Repayable wind. – potatoes	-	3	3	6
Repayable wind. – alpacas	1	9	8	18
Agroideas wind. – alpacas	1	14	13	28
Total	10	60	57	127

Water Management Benefits Downstream

Water saved as a result of the EBA interventions will benefit the beneficiaries of the Puna Facility who will see increased productivity and income as a result of better water availability. These impacts are already captured in the incremental CR cashflows vs. BAU cashflows for the 127 Local Initiatives, as per previous sections.

Increased water availability will also benefit water users downstream of the high puna. Not all water saved from EBA will be directly used by the high puna value chains but could be sold by the utilities downstream. Volumes of such water have been estimated based on the EBA area targeted and water savings per unit area. The value of such water reflects the water tariff charged by the Cusco water utility – one of the main water utilities in the target regions.

Economic Benefits and CO2 Sequestration of Local Initiatives Funded With Repaid Grants

[10] Ibid.
[11] https://ember-climate.org/data/data-tools/carbon-price-viewer/

58. Conservatively, it is assumed that 50% of the total grant amount disbursed in the repayable and Agroideas windows will be repaid. This may result from any combinations of Local Initiatives not repaying the entirety or part of the principal. The total amount repaid is estimated at EUR 3.4 million.

59. For the sake of clarity, 50% refers to the expected repayment ratio out of the overall amount of repayable grants disbursed by the Puna Facility. Each repayable grant agreement will require full 100% repayment and beneficiaries will be expected to comply with that full repayment. The 50% repayment ratio at portfolio level is a high-level, conservative estimate used to get a rough sense of the reflows into the Puna Facility that can be used for future calls for proposals. Such repayment ratio could be the result of some local initiatives repaying the whole amount, some not repaying at all and some repaying in part – the exact combination is impossible to forecast at this stage. The purpose of repayable grants is to finance businesses that embark for the first time in EBA investments and new business practices. Targeting a very high repayment ratio, close to 100%, would mean financing bullet-proof, established businesses for whom repayable grants would be too concessional (PF not taking enough risk to launch/upscale businesses). At the same time, assuming very low repayment ratios, close to 0%, would mean that the vast majority of grants are disbursed to businesses that fail to repay either due to poor financial performance (despite the PF support) or opportunistic behavior (PF taking too much risk). For reference, EBBF expects repayments ratios to range from 25% for very immature businesses to 65% for more mature ones. The 50% estimate used in the resubmitted version of the financial and economic model falls within the EBBF range.

60. Repayment schedules are tailored to each Local Initiative template. Repayment starts on the first year after the last grant disbursement and is spread over a maximum of 5 years. Repaid amounts per year vary based on the available cashflows that year.

61. Considering the timing of the calls for proposals and of grant disbursements (usually over 2 or more years, based on the Local Initiative's investment schedule), repayments are expected to start at the earliest in year 6 and continue until year 12. The largest annual repayments would take place in years 8 to 11.

62. It is assumed that the Puna Facility will run a call for proposals each year when a repayment occurs. While some annual repayments may seem too small to justify the time and effort to run a call for proposal, we should note that by, that time, the Puna Facility expects to raise significant funds from other donors, and it will therefore have the capacity to run calls for a larger number of Local Initiatives. (Conservatively, benefits of any Local Initiatives funded from future third-party donor funds are not included in the economic analysis).

63. The Puna Facility has the flexibility to redeploy funds in the same way as during the GCF project period. Please see EIRR model, rows 182-190, for clarity. There, we assume that the typical business receiving grants in future calls for proposal will be a hypothetical weighted average of the businesses financed across the three windows (non-repayable, repayable and Agroideas) in the first three calls for proposals (weighting reflects the number of projects per sector in the first three calls). Based on a weighted average grant size of ~EUR 141k, 24 new local initiatives will be funded in future calls for proposals.

64. It is worth noting that the timeframe of the economic analysis (17 years) only captures a few years of positive net cashflows for the future Local Initiatives funded. Therefore, this component of the economic analysis has almost no impact on EIRR in the chosen timeframe.

65. The GHG reduction of 51,358 tCO2e for the 24 future initiatives is based on the GHG reduction from the 127 initiatives in the initial 3 calls, proforma.

66. Conservatively and because the timeline for the economic analysis is limited at 17 years, we have not modelled calls for proposals that would occur in the more distant future, funded with further grant repayments.

Economic Benefits of Local Initiatives under MIDAGRI Co-Finance

67. Amounts provided as co-finance by MIDAGRI under the Agro Rural, UEFSA, PSI and DSFFA programs will fund Local Initiatives with a positive economic return:

    a. MIDAGRI has indicated such EIRRs at 33% for Agro Rural Local Initiatives, 21% for EUFSA and 11% for PSI.

    b. The sectors targeted by DSFFA are consistent with those targeted by the Puna Facility, with the difference the DSFFA provides concessional loans at 3.5% rates. It is assumed that the EIRR out of DSFFA Local Initiatives is 15%, roughly equivalent to the average FIRR of Puna Facility Local Initiatives (repayable and Agroideas windows) less interest charge.

68. Positive annual economic benefits for each program have been simulated to result in the above EIRRs. These positive economic benefits flow into the overall GCF EIRR calculation.

Other Adjustments in the EIRR Calculation

69. Amounts contributed by Agroideas in grants under the Agroideas window, as well as the cash contribution of Agroideas beneficiaries (net of the grant) have been added to the project budget.

70. Also added to the project budget is EUR 1 million for Puna Facility operating costs, which Profonanpe has committed to self-fund.

71. The addition of these cost items creates a full picture of the project's cost which is the basis for the generation of economic impact.

Results

72. The economic IRR of the project under the above assumptions is 8.2% – comfortably above the social discount rate of 6%. The economic NPV is a positive EUR 11.9 million.

73. Sensitivities have been run on two assumptions: (i) downside sensitivity to the already conservative CO2 shadow price and (ii) change in GHG reduction volume and economic benefits of Local Initiatives during the initial 3 calls for proposals. The analysis shows that the EIRR is positive even with extremely low CO2 prices and with a 30% drop in emission savings volume and income generated by the initial calls for proposals. The EIRR remains above the social discount rate of 6% and the economic NPV is therefore positive if the emission savings

volume and economic benefits do not drop more than 10%, even at carbon prices lower than EUR 60/t.

		EIRR sensitivity			
		Change in emissions and income			
		-30%	-20%	-10%	0%
	5	2.2%	3.5%	4.7%	5.7%
	10	2.4%	3.7%	4.9%	6.0%
	15	2.6%	3.9%	5.1%	6.2%
	20	2.8%	4.1%	5.3%	6.4%
	25	3.0%	4.3%	5.5%	6.6%
Carbon	30	3.2%	4.5%	5.7%	6.9%
price	35	3.4%	4.7%	6.0%	7.1%
(EUR/t)	40	3.5%	4.9%	6.2%	7.3%
	45	3.7%	5.1%	6.4%	7.5%
	50	3.9%	5.3%	6.6%	7.7%
	55	4.1%	5.5%	6.8%	7.9%
	60	4.3%	5.7%	7.0%	8.2%

		ENPV sensitivity			
		Change in emissions and income			
		-30%	-20%	-10%	0%
	5	(17.6)	(12.2)	(6.8)	(1.4)
	10	(16.7)	(11.2)	(5.7)	(0.2)
	15	(15.9)	(10.2)	(4.6)	1.0
	20	(15.0)	(9.3)	(3.5)	2.2
	25	(14.2)	(8.3)	(2.4)	3.4
Carbon	30	(13.3)	(7.3)	(1.3)	4.6
price	35	(12.5)	(6.4)	(0.2)	5.9
(EUR/t)	40	(11.6)	(5.4)	0.8	7.1
	45	(10.8)	(4.4)	1.9	8.3
	50	(9.9)	(3.4)	3.0	9.5
	55	(9.1)	(2.5)	4.1	10.7
	60	(8.2)	(1.5)	5.2	11.9