AFB/B.35.a-35.b/13
5 June 2020

Adaptation Fund Board
Project and Programme Review Committee

REQUEST FOR A CHANGE IN EXECUTION ARRANGEMENTS AND DISBURSEMENT SCHEDULE: ECUADOR (CAF)

Background

1. The Adaptation Fund Board (the Board), intersessionally between its thirty-first and thirty-second meetings, approved the project titled “Increasing adaptive capacity of local communities, ecosystems and hydroelectric systems in the Río Blanco upper watershed (Toachi-Pilatón watershed) with a focus on Ecosystem and Community Based Adaptation”, submitted by the Development Bank of Latin America (CAF) for a requested amount of US$ 2,489,373 (decision B.31-32/9).

2. The objective of the project is to strengthen the adaptive capacity of vulnerable populations, ecosystems and hydroelectric systems in the Río Blanco upper watershed and develop a model of adaptation to climate change that can be replicated in similar context in the country and in the region.

3. The project includes three main components: i) Conservation of vegetation cover on an area of 230,000 ha, supported by the introduction of the active sustainable forest management and conservation technologies; ii) Adaptation of farming practices to new climate change conditions and enable their climate smart financing; and iii) Strengthening of local capacities and share lessons.

4. The project was approved with conditions, as per the afore-mentioned decision (B.31-32/9), which cites “The agreement should include the following items, to be supplied by CAF: (i) The fully-developed project document which is updated to remove any inconsistencies throughout the document. This includes updating Section III.C of the proposal to include a reference to the Environmental and Social Management Plan (ESMP) mechanism for compliance with the Environmental and Social Policy (ESP) of the Fund for the unidentified sub-projects (USPs) and an explanation of how this will be implemented; and, (ii) The ESMP of the project which is updated, including amendment of the Monitoring, evaluation and oversight programme, clarifying how monitoring, evaluation and oversight requirements emanating from the reviews of the USPs will be integrated in the overall project monitoring and evaluation activities”.

5. The documents to meet the conditions were submitted to the secretariat on November 2019 and, following a review, cleared by the secretariat on May 8, 2020. The project agreement could not yet be signed, as the revised project submitted included additional changes requested by CAF. These pertain specifically to the inclusion of an executing entity and the revision of the project disbursement schedule.

6. The request for changes from the implementing entity (CAF) was submitted in November 2019 as part of the revised proposal to meet the project approval conditions, the letter of endorsement from the Designated Authority of Ecuador was submitted in May 2020 (see Annex 1), and the revised fully-developed programme document highlighting these changes was submitted in November 2020 and resubmitted in May 2020 (see Annex 3 for the latest version cleared by the secretariat following its final technical review).

Secretariat's review of the request

7. Following a review of the request, the secretariat finds that despite the proposed changes in the project implementation arrangements, the project will still deliver the same objective and adaptation benefits. At the request of the Government of Ecuador, the introduction of the Food and Agriculture Organization (FAO) as an additional executing entity, will support the capacity of the Ministry of Environment (MoE), through the financial and operational execution of the project.

8. The suggested changes are reflected in the revised proposal attached to this document (Annex 3).

9. In its role as an additional executing entity, FAO will be responsible for the provision of technical assistance, execution of activities in the intervention area and day-to-day supervision and monitoring. FAO will be also responsible for the financial and operational execution of the project and will carry out procurement and contracting services according to its policies and procedures. In general, FAO will be responsible of the following tasks: i) Provide technical assistance in accordance with the project document, implementation plan, budgets and FAO standards and procedures; ii) Provide technical guidance that ensures that the respective technical quality is applied in the project activities; and iii) Carry out monitoring and evaluation activities.

10. The MoE role as executing entity consists of providing the political and strategical orientation for the project and leading the governance and decision-making process within the Project Steering Committee and Technical Committee (see figure 49 for the project organigram).

11. With the introduction of FAO as an additional executing entity, CAF requested for a revision of the project disbursement schedule as well. The revised disbursement schedule presents the same project total amount as the one approved through decision B.31-32/9, and the proposed changes are related to the size of the individual tranches (original and revised disbursement tables are presented in Annex 2). Additionally, the project total cost is now amounting to US$ 2,304,975 (previously was US$ 2,370,000). The project fees have also changed, specifically the Implementing Entity Fee now increased to 8% (from 5% previously) and amounts to US$ 184,398 (from US$ 119,373 previously), while the project execution cost decreased from 7.5% previously to 5% currently, at the amount of US$ 114,975 (from US$ 180,000 previously). These changes are in line with the limits set by the Fund Operational Policy and Guidelines and do not require approval by the Board. Therefore, the secretariat finds that the request for a revision of the project disbursement schedule is justified, to accommodate the change requested in the implementation arrangements as afore mentioned described.

12. It is further noted, that the budget allocations at output level (table project components and financing of Annex 3) have not changed. Likewise, the detailed budget has not changed, except for the project fees and the total project cost.

13. Finally, the project results framework, including milestones, targets and indicators presented in section E of the revised project document, has not changed from the approved project.

Recommendation

14. Therefore, the Board may consider and decide to:

a) Approve the inclusion of Food and Agriculture Organization as an additional executing entity and a revision of the project disbursement schedule for the project “Increasing adaptive capacity of local communities, ecosystems and hydroelectric systems in the Río Blanco upper watershed (Toachi-Pilatón watershed)”, as requested by the Development Bank of Latin America (CAF) and contained in the revised proposal presented as Annex 3 of document AFB/B.35.a-35.b/13; and

b) Request the secretariat to draft an agreement with CAF as the Regional Implementing Entity for the project, to reflect the revisions approved under subparagraph a) above.

Annexes

1. Letter by the Designated Authority for Ecuador endorsing the proposed changes;
2. Original and Revised Project Disbursement Schedule;
3. Revised proposal document with tracked changes addressing comments made by the secretariat in its initial review.

Annex 1: Letter by the Designated Authority for Ecuador endorsing the proposed changes

ADAPTATION FUND

Letter of Endorsement by the Government

Government of Ecuador
Ministry of Environment and Water

Quito, 27th May, 2020

To: The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat
Email: Secretariat@Adaptation-Fund.org
Fax: 202 522 3240/5

Subject: **Endorsement for the National Project Proposal: "Increasing adaptive capacity of local communities, ecosystems, and hydroelectric systems in the Río Blanco upper watershed (Toachi - Pilatón watershed) focusing on Ecosystem and Community Based Adaptation and Integrated Adaptive Watershed Management"**

In my capacity as designated authority for the Adaptation Fund in Ecuador, I confirm that the above-mentioned national project proposal is in accordance with the government's National Adaptation Plan and its priorities of implementing adaptation activities to reduce the impacts and risks of climate change in Ecuador.

The issues related to letter (c) of the Decision B.31-32/9 were addressed with the support of the Latin American Development Bank (CAF) as the Regional Implementing Entity, and the Food and Agriculture Organization of the United Nations (FAO) as the Executing Entity in order to proceed with the request stated in letter (d) of the same decision.

Accordingly, I am pleased to endorse the aforementioned national project with the support of the Adaptation Fund.

Sincerely,

Carlos Arturo Espinosa Gallegos Anda
National Designated Authority
Undersecretary of Climate Change
Ministry of Environment and Water Ecuador

Annex 2: Original and Revised Project Disbursement Schedule

Disbursement schedule in original project document

Description	Year 1	Year 2	Year 3	Year 4	Total
Date	15 January 2018	15 January 2019	15 January 2020	15 January 2021	
Project funds	$678.341,5	$593.773,5	$593.773,5	$504.111,5	$2.370.000
Implementing Entity management fee	$25.971,00	$31.133,00	$31.133,00	$31.136,00	$119.373
Total	$704.312,5	$624.906,5	$624.906,5	$535.247,5	$2.489.373

Disbursement schedule from proposal dated 21.11.2019

	Upon Agreement signature	One Year after Project Start[a/]	Year 2[b/]	Year 3	Total
Project Funds	620,397.08	571,830.08	637,581.10	475,166.74	2,304,975.00
Implementing Entity Fee	25,971.00	52,808.00	52,808.00	52,811.00	184,398.00
Totals	646,368.08	624,638.08	690,389.10	527,977.74	2,489,373.00

Annex 3: Revised proposal document with highlighted changes addressing comments made by the secretariat

REQUEST FOR PROJECT/PROGRAMME FUNDING FROM THE ADAPTATION FUND

The annexed form should be completed and transmitted to the Adaptation Fund Board Secretariat by email or fax.

Please type in the responses using the template provided. The instructions attached to the form provide guidance to filling out the template.

Please note that a project/programme must be fully prepared (i.e., fully appraised for feasibility) when the request is submitted. The final project/programme document resulting from the appraisal process should be attached to this request for funding.

Complete documentation should be sent to:

The Adaptation Fund Board Secretariat
1818 H Street NW
MSN P4-400
Washington, D.C., 20433
U.S.A
Fax: +1 (202) 522-3240/5
Email: afbsec@adaptation-fund.org

CONTENT

ADAPTATION FUND

PROJECT/PROGRAMME PROPOSAL TO THE ADAPTATION FUND

PART I: PROJECT/PROGRAMME INFORMATION

Project/Programme Category:	Regular Project/Programme
Country/ies:	Ecuador
Title of Project/Programme:	Increasing adaptive capacity of local communities, ecosystems and hydroelectric systems in the Río Blanco upper watershed (Toachi-Pilatón watershed) with a focus on Ecosystem and Community Based Adaptation and Integrated Adaptive Watershed Management.
Type of Implementing Entity:	Regional Implementing Entity (RIE)
Implementing Entity:	CAF Latin America Development Bank
Executing Entity/ies:	Food and Agriculture Organization (FAO) and Environmental Ministry of Ecuador
Amount of Financing Requested:	2,489,373.00 (in U.S Dollars Equivalent)

Project / Programme Background and Context:

1. The proposed project aims at strengthening the adaptive capacity of vulnerable populations in the Río Blanco upper watershed and develop a model of adaptation to climate change that can be replicated in similar context in the country and in the region.

Overview Río Blanco upper watershed

2. The Toachi-Pilatón (Río Blanco upper watershed) water system is composed by a 2,154.42 km2 drainage basin with a total population of approximately 74,000 people (Table 1). It is a system with two drainage units that originate in the steep western slope of the Andes, and flows downhill to merge in the Blanco River. It is the southernmost sub-basin of the Esmeraldas river watershed (Ecuador´s fourth largest watershed), covering 10% of the Esmeraldas drainage basin.

3. The Toachi drainage unit has four sub-basins (Map 1 in **Error! Reference source not found.**), formed by several tributaries, most of them originating in the paramos (> 3,000 meters above sea level) within the Ilinizas Ecological Reserve (e.g., river Las Juntas, river Negro, river Sarapullo). The Pilatón drainage unit is about a fourth of the size of the entire system. The Pilatón River is also formed by high altitude tributaries, some of them also originate in the Ilinizas reserve (e.g., river Negro). However, both the Toachi and Pilatón rivers have a large contribution from tributaries that accumulate and channel water from the forests located on the steep hills.

Drainage unit	Province	Canton	Parrish	Total population in the Parrish	Population within the drainage unit
Toachi	Cotopaxi	Latacunga	Toacaso	7,685	7,685
		Pujili	Guangaje	8,026	8,026
			Zumbahua	12,643	12,643
		Sigchos	Chugchilan	7,811	7,811
			Isinlivi	3,227	3,227
			Las Pampas	1,943	1,943
			Palo Quemado	1,030	1,030
			Sigchos	7,933	7,933
	Pichincha	Mejía	El Chaupi	1,456	NA
Pilatón	Pichincha	Mejia	Aloag	9,237	NA
			Manuel Cornejo Astorga (Tandapi)	3,661	3,661
	Santo Domingo de los Tsachilas	Santo Domingo	Alluriquin	9,725	9,725
Total population in 2010				**74.377**	**53.959**

NA = Not available, but it is known to be very small

Table 1: Population in the Río Blanco system (Source: Ecuador Population and Housing Census 2010.)

4. The lower part of the system is humid with annual precipitation above 2,000 mm/year (Table 2). In contrast, the upper part of the Toachi drainage unit is much drier. In Sigchos, the annual rainfall in 2012 was about 1,130 mm. There are two seasons, a rainy season between December and May, and a dry season between June and October (Figure 1).

Station	Data series (years)	Annual precipitation (mm/year)	Monthly minimum (mm/month)	Monthly maximum (mm/month)
Toachi AJ Pilatón	1967-1985	2,745.8	64.8	451.7
Palo Quemado	1965-1995	2,126.8	55.5	326.4
Las Pampas	1985-2006	2,126.8	33.9	353.0
Sigchos	2012	1,130.4	5.2	247.60

Table 2: Precipitation in four meteorological stations of the Río Blanco (Toachi-Pilatón watershed) system (Source: INAMHI meteorological yearbooks)

5. Two provinces (Pichincha and Cotopaxi) and two cantons (Mejia and Sigchos) (in Ecuador the canton is the same as municipality) and six parishes (Palo Quemado, Las Pampas, Manuel Cornejo Astorga, Aloag, El Chaupi, and Sigchos) (in Ecuador parrish is the minimum unit of local government) share the elements of the Río Blanco upper watershed water system. Local communities depend mostly on extensive farming characterized by low productivity, sub-optimal use of economic resources and ecosystems, and with negative impacts on ecosystems and communities, exposing them vulnerable to climate change. Agriculture extensive practices are not only inefficient, but they also contribute to deforestation, overexploitation of water resources and sedimentation, reduction of soil quality and exposing smallholders to climate hazards.

6. On the Toachi side, the main activities are subsistence agriculture and extensive livestock. In the area of Palo Quemado, farmers cultivate 450 ha of sugarcane to produce panela (unrefined whole cane sugar) where 98% of the sugarcane harvest is used to produce panela (GADPRPQ, 2013); and 28% of the local population is engaged in the production of panela. According to primary data collection, there are associations in the area made up exclusively of women. Those associations are San Pablo Association with 6 women, Marianita de Jesús en Las Pampas composed by 18 women and Flor de Caña Association with 47 women. Panela is more profitable than other activities, but its artisanal production is based on the use of local trees for firewood. Each farmer uses about -three trees per week- to cook and produce the sugarcane juice, contributing to deforestation, soil erosion and increasing climate vulnerability. Moreover, traditional production of panela can contribute to negative heath impact, due to the respiration of inorganic compounds, and causing local air pollution.
7. On the Pilatón side, extensive livestock farming and subsistence agriculture are the most important economic activies. Commerce and small family restaurants predominate along the Aloag – Santo Domingo road.This is the main road that connects the country´s highlands and the coast; it runs along the west bank of the Pilatón River. Extensive livestock farming contributes to deforestation, increasing climate vulnerability and reducing soil quality. Moreover, extensive livestock farming is economically inefficient, becoming profitable for larger properties, and hence contributing to support socio-economic inequality.
8. Rural communities, agriculture practices and ecosystems strongly depend on water access and use. To understand present and forecasted water availability is hence of major importance under climate change scenarios where excess of deficit of water can affect local communities economy and agirulture.

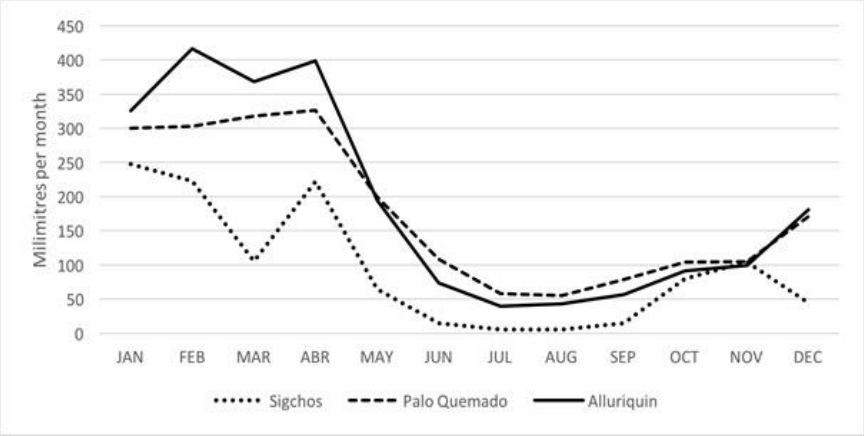
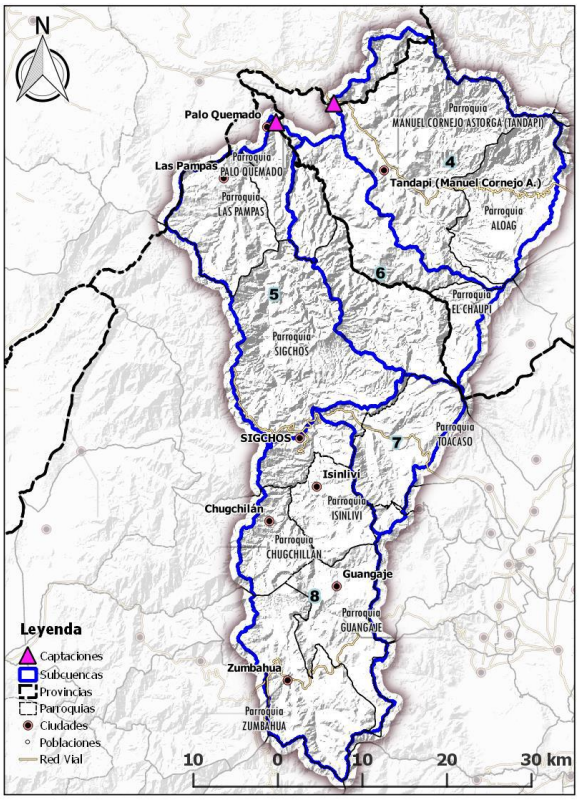


Figure 1. Monthly precipitation in three stations of the Toachi – Pilatón system (Río Blanco upper basin). Sigchos is located in the upper part of the Toachi unit (2,880 masl) (precipitation data from 2012). Palo Quemado is in the lower part of the Toachi unit (ca., 1,100 masl).

The Toachi-Pilatón hydropower station[1]

9. A hydropower station is being built in the lower part of the Toachi-Pilatón system (i.e., HIDROTOAPI). It has two turbine systems, one based on the Toachi – Alluriquin confluence planned to produce ca. 204MW, and the other based on the Pilatón – Sarapullo confluence planned to produce ca. 49 MW (Map 1). The total expected energy production will be 254.4 MW.



Map 1. Parishes and main localities in the Toachi - Pilatón water system.

10. The Toachi Pilatón Hydroelectric Project in its initial studies dates back to 1963 when the National Institute of Electrification (INECEL) began a strategic policy of evaluating hydroelectric projects at various scales throughout the national territory. At the time, the economic feasibility of the project was already demonstrated, however for decades it remained in plans.

11. In 1965, experts from the National Electricity Company of Chile (Endesa), proposed a development of a 108 megawatts (MW) installation. Later, in 1973 and 1974, the Swiss Consultant Motor Columbus revised the scheme and recommended to transfer the waters of the Pilatón River to the Toachi basin and install a 225 MW system, building a dam at 180 m downstream of the confluence of the Sarapullo and Toachi rivers. At the end of the 1980s with technical and financial assistance from the Canadian Government, studies were reviewed recommending a 190 MW installation.

[1] Information from the Hidrotoapi website at https://www.celec.gob.ec/hidrotoapi/

The last study in 1996 of the Egesco Consortium under the supervision of Harza Engeneering confirmed the characteristics of the project.

12. In 1997, through the Executive Decree No. 18, the Provincial Council of Pichincha was granted the authority to carry out the 190 MW Toyo Pilatón Hydroelectric Project. The Provincial Council initiated a series of validations and requirements to be able to start the construction process, which ended with a neutral assessment that did not support the start of the project.

13. In 2002, the Pichincha Province Assembly resumed updating the feasibility studies in order to carry out the project, and carried out studies on legal, operational, administrative and technical issues of the project.

14. On August 25, 2005, the Honorable Provincial Council of Pichincha subscribed the document of constitution of the denominated Hidrotoapi SA, whose main object consists in the design, construction, installation, operation and maintenance of power generation plants.

15. According to the latest Electrification Master Plan of the Ministry of Energy and Non Renewable Natural Resources (MENRNR) for 2016-2025, the plant should have started production in 2019. However due to economic constrains it has been postponed. Formal agreements between MAE and MENRNR will be resumed at project inception phase.

16. An environmental social risk analyses was elaborated for improving the knowledge about impact between the project and the hydroelectric central. The potential impacts of the operation of the hydrological station have been presented concluding that ecological flow rate has to be monitored on a monthly basis[2] by the hydroelectric central.

17. The Toachi-Pilatón hydropower station is considered a co-beneficiary of the project given its expected benefit. Also, the Hidrotoapi is identified as potential contributor to the planned Investment Fund. The Investment fund targets the sustainability and development of adaptive capacity of vulnerable populations as well as the restoration and conservation of vegetation cover in the watershed and would – once the Hidrotoapi started its production – hence benefit the power plant directly.

<u>The socio-economic situation of local communities</u>

18. The population has very high levels of poverty expressed as unsatisfied basic needs (Poverty Index). Four parishes located in the upper part of the Toachi unit had poverty levels above 98% and highest level of agriculture dependency, according national census 2010:

[2] Determination of the recommended minimum ecological flow rates, i.e. the minimum flow rate recommended by the old regulation has been adopted, as 10% of the average annual flow rate through the Toachi and Pilatón rivers at the dam sites. This study will need to be updated and respective ecological flow rate regimes need to be established.

Parish	Main Activity	Second activity	Poverty Index	GINI
Aloag	Agriculture 24,2%	Manufacture industries 15,2%	28%	31%
El Chaupi	Agriculture 61,3%	Manufacture industries 7,3%	41%	29%
Manuel Cornejo Astorga (Tandapi)	Agriculture 47,8%	11,8% Commerce	64%	27%
Sigchos	Agriculture 68,6%	Manufacture industries 5,9%	62%	29%
Chugchilán	Agriculture 85,7%	Teaching 2,0%	83%	26%
Las Pampas	Agriculture 65,0%	Manufacture industries 21,7%	52%	26%
Palo Quemado	Agriculture 46,8%	Manufacture industries 28,8%	59%	26%

Table 3: Main activities by locality, based upon data from National Census (2010)

19. Even parishes with more developed economic activities like Palo Quemado, Manuel Cornejo Astorga and Aloag had poverty levels above the national average. Poverty is a gender uneven reality, affecting more to women than men. In 2013, number of women, from the age of 20 to 59 years, living in poor households was higher than that of men, leading to a feminity index in poor households of 117.6 (CEPAL, 2013)[3]. Lack of personal income is one of the main reasons behind high poverty ratios among women, since more than one out of every three women (35.1% from age 15 and above) do not have any sort of personal income (and no access to education beyond primary), compared to 9.1% of men (CEPAL, 2014)[4].

20. In the same line, the levels of illiteracy are above the national level (see Figure 2). The highest levels of illiteracy are also concentrated in the upper part of the Toachi unit.

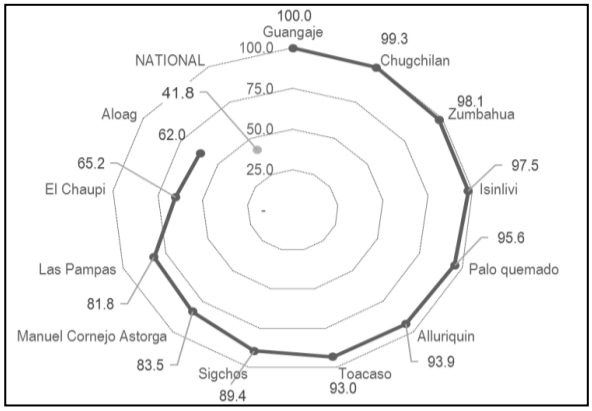


Figure 2: Poverty by unsatisfied basic needs in the parishes of Río Blanco water system (2010 census).

21. Women have higher illiteracy rates, compared to men, 21.6% compared to 19.2% respectively. Moreover, in these communities, men have more years of schooling: with on average 4.7 years of schooling for men and 4.4 years for women. This gender bias in literacy is also present at the national level, with a wider gap in rural areas (Table 4).

Illiteracy rates	Functional illiteracy rates	Digital illiteracy rates

[3] The femininity index in poor households compares the percentage of poor women and men from the age of 20 to 59 years. Poor households typically gather a higher proportion of women in an age of a bigger productive and reproductive demand. The index shows how many times the incidence of poverty (indigence) is greater among women than among men. A figure greater than 100 means that poverty (indigence) is higher among women; a figure less than 100, the inverse situation.
[4] CEPALSTAT, Gender indicators.

Urban		Rural	Urban	Rural	Urban	Rural
Men	3.2%	4.6%	7.0%	20.2%	18.6%	34.4%
Women	10.7%	15.2%	8.9%	25.6%	24.7%	43.2%

Table 4: Illiteracy rates, Functional illiteracy rates and digital illiteracy rates (Source: Women and Gender Equality National Agenda, 2014 – 2017, based upon data from INEC (2013))

22. As per different parishes, the following figure provides an overview in the area of the project, showing the great differences and educational heterogeneity between the different parishes. This great dispersity will be taken into account when developing the communication and the capacity building solutions within the project[5].

23. Illiteracy also affect the level of financial literacy of vulnerable populations, usually limiting the capacity to embrace the basics of investment decision, especially with respect to the decision of investing in new technologies. Therefore, the project will also address basic components of economic analsys of suitable adaptation measures.

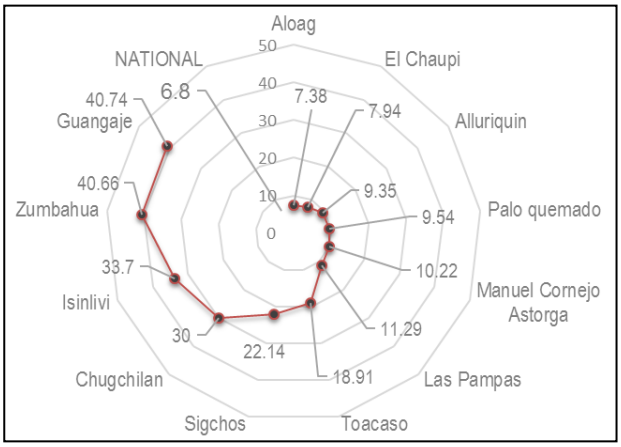


Figure 3: Percentage of illiteracy in the parishes of the Río Blanco water system (2010 census).

24. A major focus will be laid on the capacity development of women as household leaders to disseminate a deep understanding of adaptation economics. This is especially important, as women play a vital role in ensuring and managing access to water and the household's food security (see **Error! Reference source not found.**).

25. Today, the main drivers of deforestation and degradation in the basin are the expansion of pastures for livestock and small-scale agriculture. The changing trends in land use and land cover in the watershed due to human pressures such as deforestation and expansion of the agricultural frontier scenarios intensify soil degradation in the basin. This produces, under the effects of climate change, an altered hydrological cycle resulting in lower retention of sediments under extreme weather events, as well as a clear and observable increase of sediments in the basin in future periods (Map 4, **Error! Reference source not found.**).

Climate change effects

26. Climate change will affect local communities in the Río Blanco water system by reducing water provision for human consumption, farming production and hydroelectric energy production.

[5] Executive summary, Final Environmental Impact Study, Toachi - Pilatón hydroelectric project

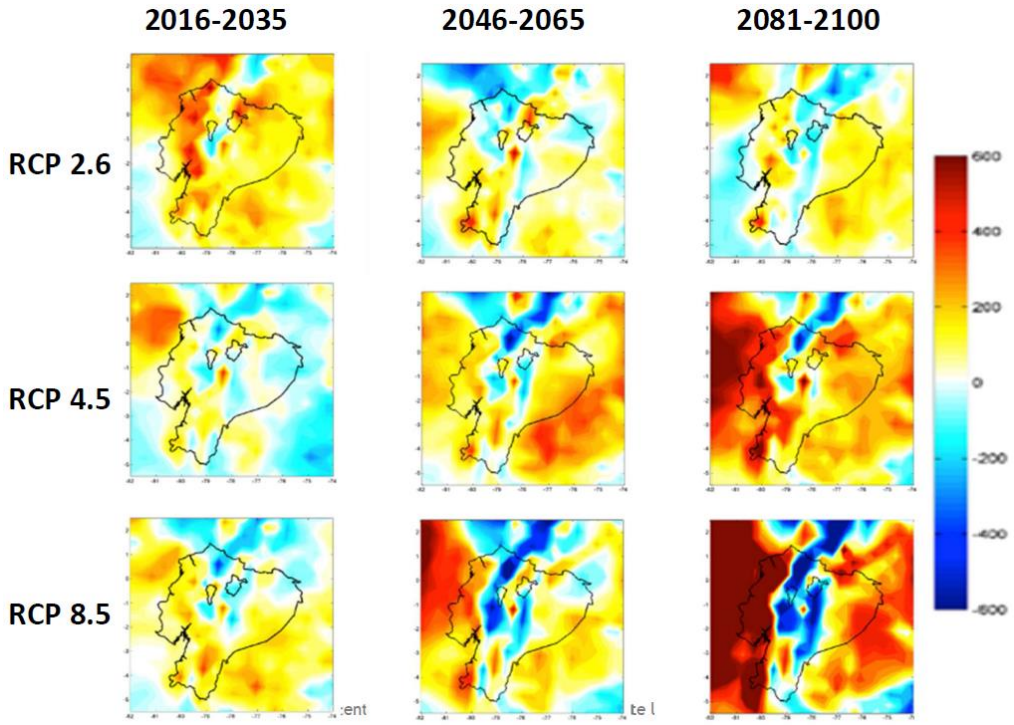


Figure 4. Climate Change Scenarios for precipitation in Ecuador (MAE – PNUD 2016)

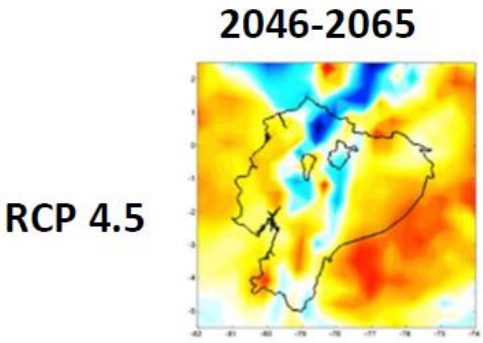
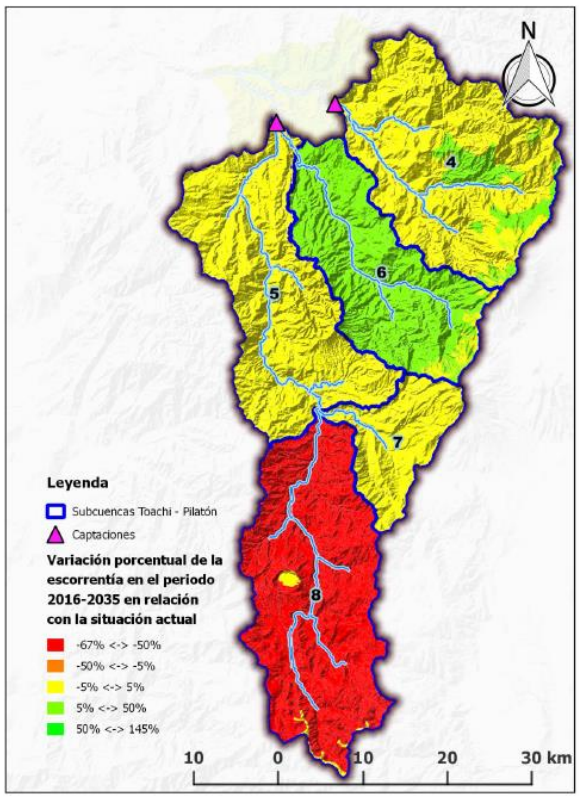


Figure 5. RCP 4.5 Ecuador

Climate change effects on the Hydropower station

27. In 2014, MAE analysed the climate change risk in the watersheds where major hydroelectric plants are based. In the Río Blanco system, it was found that the change in rainfall patterns projected into future scenarios under the effects of climate change in the watershed's recharge zone has a clear downward trend, indicating a clear reduction of water volumes (**Error! Reference source not found.**).



Map 2. Predicted change (percentage) in runoff during 2016 - 2035 with respect to the present condition in the Toachi - Pilatón water system.

28. The Ministry of Environment (MAE) has found that the Río Blanco water system will be strongly affected by climate change, it is foreseen that future changes in climate conditions will result in an overall reduction of rainfall. In addition, it is anticipated that climate change will produce stronger and more frequent El Niño–Southern Oscillation (ENSO)[6] events (Cai et al., 2014; Cai et al., 2015). During El Niño conditions heavy rainfall will exacerbate landslides, erosion, river sedimentation and floods. However, during La Niña conditions, there will be severe drought. These changes, alone, will be sufficient to modify the structure of the native montane cloud forests, which capture cloud moisture and feed streamflows. In adition, ongoing human pressures will exacerbate the impacts of climate change. The two main drivers are deforestation and soil erosion.

29. For the previously mentioned diagnostic and projection of climate change study in the areas of interest, MAE used two lines of climate modelling: An assemblage of about 23 global models provided under the CMIP5 project (MAE, 2015), and the regional model REMO adjusted by the CIIFEN-MAE 2014.

30. In order to capture smaller-scale processes, limited area climate models, nested within global models ("downscaling"), were used in such a way that it is assumed that local phenomena are based on large-scale patterns resolved in global models. This

[6] Irregularly periodical variation in winds and sea surface temperatures over the tropical eastern Pacific Ocean, affecting much of the tropics and subtropics. The warming phase is known as El Niño and the cooling phase as La Niña.

work employs the regional high resolution climate model REMO-RCM (Max Planck Institute for Meteorology in Hamburg) under the framework of the CORDEX project. The modelling was carried out within three analysis periods (2016-2035; 2046-2065; 2081-2100). The climate scenarios analysed with the REMO model are the three representative pathways of concentration, which, in order of emissions levels, are CPR2.6, RCP4.5, and RCP8.5.

31. The periods and scenarios studied pointed towards a reduction in rainfall, which will result in a significant decrease in the flow available at the intake points of the hydroelectric plant. The results obtained for temperature and precipitation readings in the feeder watershed were used as inputs for modelling flow and sediment through the Soil and Water Assessment Tool (SWAT) model. The modelling indicates that the sediments, under the effects of future climate change scenarios, will increase to about twice the current level in the hydropower station's water intakes.

32. Reduction of water availability, soil and ecosystems degradation, and extensive farming practices requiring higher volume of water, further expose local communities to food insecurity and poverty traps. Climate change will hence contribute to worsen the already fragile conditions of communities living in the area.

33. Moreover, monitoring capacity for weather or climate is poor in watersheds. The Toachi basin has indeed a bad monitoring system: with few meteorological stations, minimum gauging stations and no sediment stations. Therefore, it is not possible to track the flow and sediment and it is not possible anticipate with certainty the events.

34. The foreseen reduction in runoff and the increase in sediments (from hillside erosion) will also affect HIDROTOAPI. MAE has estimated that its susceptibility may lead to a decrease of > 25% of its current annual projected generation capacity, and it may be exposed to greater risk due to reduced water flow and increased sediments.

Climate vulnerability and effects of climate change of local communities

35. In the lower part of the drainage system, mainly along the hillsides, it is common to have frequent landslides mainly during the rainy season. The area along the Pilatón River has high risk of both landslides and flooding (Jiménez, 2013; Proaño, 2015). Landslides are frequent along the Aloag – Santo Domingo road. Younes & Erazo (2016) found that landslide susceptibility along this road is related to active erosive processes, soil condition and rainfall between 1,500 and 1,750 mm. Road closures and traffic restrictions produce important economic losses and access problems to local communities. On April 2015, the road was closed for 20 days and isolated the locality of Tandapi. Landslides and flooding are aggravated during El Niño conditions. During the 2015 / 2016 El Niño events, there were frequent and large landslides along the Aloag – Santo Domingo road. Only in April 2016, there were about 25 landslides.

36. The hillsides in the lower part of the drainage system maintain large areas of natural and intervened montane cloud forest, which are important for the water cycle and biodiversity (**Error! Reference source not found.**-Map 2). The rest of the system is mostly used for agriculture and extensive livestock farming.

37. The forest cover is mostly included in two Protected Forests[7]: (1) Toachi – Pilatón (BP156) and (2) Sarapullo (BP165). The Toachi – Pilatón Protected Forest was created in 1987, and is a large area of about 212,000 ha. The Sarapullo Protected Forest (BP165) was created in 1986, it covers 21.585 ha. In addition, there are several private reserves that are trying to develop services like trail hiking and bird watching. The forest area has a high biodiversity conservation value. There are populations of puma (Puma concolor) and the spectacled bear (Tremarctos ornatus), which are classified, respectively, as vulnerable and endangered in Ecuador´s IUCN red list of threatened species. The main threat to these species are habitat loss caused by deforestation, and hunting by farmers. In addition, a major part of the drainage system is an Important Bird and Biodiversity Area[8] (IBA).

38. Indeed due to ecosystems degradation and low economic return, smallholders have lower adaptive capacities resulting in higher climate vulnerability. Vulnerability is not even among groups: women, with higher poverty level and lower access to income generating activities, have fewer coping mechanism and hence they are more exposed to climate change. Women are forecasted to be more vulnerable to these changes. They are usually indeed in charge of domestic chores, such as harvesting water and food security, and most of the times they also do most of agricultural work. This uneven allocation of water dependent activities between men and women exposes women to higher risks concerning lack of water provision (UNEP, 2011)[9]. **Error! Reference source not found.** summarizes the situation and the interaction with human pressures.

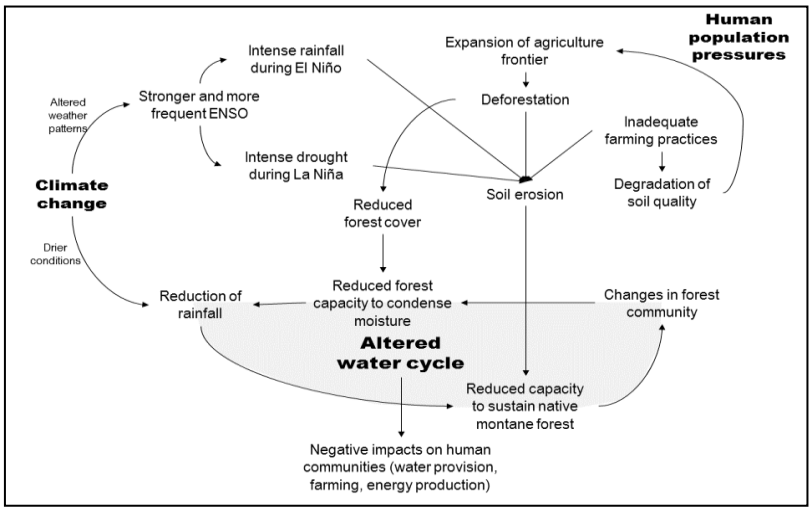


Figure 6. Conceptual diagram of climate change impacts on the water cycle of the Río Blanco water system.

[7] Protected Forest are areas established by the Ministry of Environment with the main purpose to conserve watersheds and water sources and to contribute to protect wildlife. These can be public or private land, and managed by public entities or private landowners. The protected forests are not considered a protected area, and do not integrate the national system of protected areas.

[8] The Pilatón drainage unit is part of the Rio Toachi – Chiriboga IBA (EC044) which cover 68,000 ha (Birdlife International, 2016). The area houses about 450 bird species, including *Pachyramphus spodiurus* which is a endangered species. The lower part of the Toachi drainage system is part of the Reserva Ecológica Los Ilinizas y alrededores IBA (EC045) which cover 150,900 ha (Birdlife International, 2016a). This IBA house about 257 bird species.

[9] Women at the frontline of climate change. Gender risks and hopes. UNEP, 2011.

39. In general, farmers use inadequate agriculture practices which produces soil depletion, this reduces production and motivates further expansion of the agriculture frontier. All this contributes to soil degradation, soil erosion, and a reduction of vegetated areas.

40. In the lower part of the water system, deforestation is caused by expansion of agriculture and livestock. Farmers invade the forests and riversides[10] mainly to expand grazing areas for livestock and subsistence agriculture. Another factor, which contributes to deforestation, is that sugarcane farmers depend on firewood for artisanal panela production.

41. As observed in other regional contexts, economic poverty regularly induces ecosystem degradation, while ecosystem degradation generates and maintains poverty traps. For example, low technification of agriculture practices leads to over-exploitation of agriculture frontier lands, while soil degradation reduces agriculture yields (leading to expansion), reduces soil cover and hence exposes plots to higher vulnerability to temperature and rain variability.

42. Adaptation to climate change is a major challenge for local communities. The main barriers that limit adaptation in the lower basin of the Río Blanco water system are:

    - Local population are not fully aware of climate-related impacts. The interviews with local stakeholders revealed that there is no clear understanding of the probable impacts to be generated by the climate change. The future climate scenarios and the probable worsening of existing risks are not in the common dialogue. This contributes to the fact that local population does not demand that elected authorities address adaptation as a priority matter.

    - Local development plans do not incorporate adaptation measures. Local plans (i.e., parishes and municipalities) mention climate change, but do not have specific actions to adapt living conditions to the future scenarios nor to take action to address key drivers like deforestation, land use change and invasion of riversides. Regularly, these plans do not consider the gender perspective into consideration, leaving women more exposed to climate change.

    - Local production is based on extensive farming practices. Most farmers have small farms (<20 ha per unit) with very low yields and, in general, apply inadequate agriculture practices. Primary data collection allowed to identify relevant associations in the project area, developing economic activities in agriculture and animal husbandry (mainly livestock farming). These associations currently involve groups of women, due to their active role in subsistence agriculture activities, their sensitivity for changes observed in the ecosystems, and for their leadership role in their families.

43. Table 5 shows the important role of women in the project area, as well as their influence to develop activities related to climate change adaptation:

[10] According to the Ecuadorian legislation, riversides are public domain and cannot be used in order to protect the water sources.

Parish	Association	Number of women respondents	Number of women owning land	Main economic activities	Type of crops produced
Palo Quemado	San Pablo	6	6	Panela production	sugarcane
Palo Quemado	Flor de Caña	47	NA	Panela production	sugarcane
Palo Quemado	Marianita de Jesús	18	18	Agriculture	sugarcane
Las Pampas	Las Marianitas	19	19	Livestock silage	pastures
Las Pampas	Naranjito	7	7	Livestock farming for meat production	sugarcane, pastures
Las Pampas	Aso Ganaderos	12	12	Livestock farming for meat production	sugarcane, pastures, naranjilla
Las Pampas	Asopam	15	15	Panela production	sugarcane, pastures
Las Pampas	Sembrando un futuro	5	5	Livestock farming for meat production	sugarcane, pastures, naranjilla
Las Pampas	Campo Verde	6	6	Livestock farming for meat production	sugarcane, pastures

Table 5: data collected during group discussions in workshops presentation and discussion of final project proposal (see **Error! Reference source not found.**)

44. In Palo Quemado, 50% of the farmers have only subsistence production. Livestock farmers use extensive grazing and the productovoty per cow is about 7 litres of milk / day. The common practice is to clear forests to expand the grazing and agriculture areas. Sugarcane farmers clear forests to obtain firewood for panela production. At the same time, these producers indicate that the availability of the required firewood is decreasing, hence a more efficient and sustainable production of panela is required by the target co-executors of the project.

- Forest areas are not protected. The large public protected forests are not properly managed. Extensive areas have been invaded and cleared to establish farms. Land tenure is an additional related issue, because invaders claim possession rights to the municipal and central governments. Private landowners of forest areas also face pressure from invaders, however, the extent of the invaded area is unknown. The Conservation Bio-corridor[11] initiativewill be implemented as a strategy for conservation of biodiversity, land management and sustainable development in the project area that includes an improvement of land tenure. Part of the project includes watershed population training with at least 50% of women participation. Evidence shows that women participation in forest protection mechanisms (committees, meetings, forest management and guards) leads to better forest control performace. Hence, it is important to train women to be part of forest protection personnel, to assure forest protection.

- Limited climate-related information. The monitoring of hydro-meteorological variables within the watershed has limitations in terms of quality and availability, generating less understanding of the behavior of water flows and sediments in

[11] Bio Corredors are the main strategy of the Ministry of Environment of Ecuador's approach to landscape management, biodiversity and sustainable development.

the basin. The National Meteorological and Hydrological Institute (INAMHI) has eight meteorological stations in the Río Blanco water system (Map 5), but only two (i.e., M0362 Las Pampas, M0363 Sigchos) are operational.

According with the methodology (phase two contrast with similar initiatives) and evaluating the current conditions of how the Project Area is located, some impacts were identified in the base in the EbA conceptualization, as detailed below:

Identified Impacts during the EbA Conceptualization		
IMPACT OF CLIMATE CHANGE IN AGRICULTURE		
Variables and Affectation	**Adaptation Alternatives EbA**	**Alternative description of adaptation**
Temperature, precipitation, CO2, Radiation Affectation Optimal development (water cycle, carbono).	EBA Ecosystems Conservation Agriculture	**Indicators** **Tracking unit:** Area under conservation agriculture (ha). **Impact unit:** Production (t / ha). Spending reduction in agricultural inputs ($)
IMPACT OF CLIMATE CHANGE ON DISASTER RISKS		
Variables and Affectation	**Adaptation Alternatives EbA**	**Alternative description of adaptation**
Variables **Temperature, Precipitation** **Affectation** Landslides Erosion	Infrastructure: Agricultural terraces that will increase the resilience of the system, consists in making cuts to the steep slope to establish cultivated terraces supported by a stonewall. Ecosystem EBA	**Indicators** **Tracking unit:** Linear distance of built walls (m). **Impact unit:** Production area and protected housing (m2 and #, respectively).
IMPACT ON FOOD SECURITY		
Variables and Affectation	**Adaptation Alternatives EbA**	**Alternative description of adaptation**
Affectation Soil quality Pest Increase	EBA Ecosystems Crop Diversification	**Indicators** Tracking unit: Surface sown in mixed schemes (he has). Associated varieties planted per unit of crop (#). Impact unit: Income ($). Varieties produced (#, t).
IMPACT OF DEFORESTATION		
Variables and Affectation	**Adaptation Alternatives EbA**	**Alternative description of adaptation**
Variables **Logging of trees** Affectation Sustainable forest management promotes the development of local communities, while retaining the biodiversity, capture carbon and can even eliminate deforestation and restore forest cover.	EBA Ecosystems Sustainable Forest Management	**Indicators** Tracking unit: Area under sustainable forest management (ha). Impact unit: Wood production (m3). Income by worker ($). Conserved surface (ha).
EROSIÓN		

Variables and Affectation	Adaptation Alternatives EbA	Alternative description of adaptation
Variables Climate, vegetation, leaf litter, soil type, topography, flow velocity, land use. Affectation The degradation of the soil, because of erosion, affects soil fertility and, ultimately, the production of the crops.	**EBA Ecosystems** Soil Conditioning: It consists of applying a series of techniques to restore the optimal conditions of organic matter, nutrients, biological activity and other essential elements for agricultural production.	Indicators Tracking unit: Surface with conditioning floors (ha). Impact unit: Increase in crop productivity (t / ha). Decrease in fertilizer spending ($ / ha).
IMPACT OF MICROFINANCE ON THE POPULATION		
Variables and Affectation	**Adaptation Alternatives EbA**	**Alternative description of adaptation**
Variables Indexed insurance. Microfinance. Affectation Accurate of the existence of a structure effective financial It is not usually accessible to the most vulnerable groups.	Financial: Actions regarding the provision of resources and financial incentives to share and transfer risks or improve the social and ecological bases of vulnerable systems. Credit access	EbA[12]capacity index adaptation based on ecosystems. The procedure consists of gathering information on the socioeconomic, productive and environmental dimensions of the agricultural unit through an interview with the farmer. The interview is linked to the credit evaluation process, either ex-ante, when the client requests the credit, or ex-post, as part of the follow-up to the disbursement. # credits

Table 6: General impacts in the basin of the Toachi – Pilatón water system (Río Blanco upper basin)

45. Table 7 summarises specific actions to address the key barriers that have been identified.

Main barriers that limit adaptation	Project actions to address the main barriers
Local population are not fully aware of climate-related impacts.	To implement a public communication and education plan on the six parishes of the upper and middle basin of the Toachi – Pilatón water systems (Río Blanco upper basin) (output 7).
Local development plans do not incorporate adaptation measures.	To work with parish councils to mainstream climate change adaptation, with a gender perspective, into the parish development plans of the six parishes of the upper and middle basin of the Río Blanco water systems (output 6). The six parishes are: (1) Manuel Cornejo Astorga, (2) Aloag, (3) El Chaupi, (4) Palo Quemado, and (5) Las Pampas (6) Sigchos
Local production is based on extensive farming practices.	To work with local farmers, women and men, to introduce best practices to reduce deforestation, land degradation and improve adaptive capacities (outputs 1 and 3). The key groups to work with are livestock and sugarcane producers. Female farmers will be specifically targeted.
Forest areas are not protected.	To strengthen the means to conserve forest and vegetation cover in the watershed. Act on two fronts:

[12] Referencia: Acceso 17/12/17: http http://unepmEbA.org/fileadmin/user_upload/Indice_de_capacidad_EbA.pdf

Main barriers that limit adaptation	Project actions to address the main barriers
	1. To work with local landowners to incentive the conservation of ca., 1000 ha of native vegetation (output 1). It will be necessary to provide incentives; the idea of establishing an investment fund (output 5) to support investment in adaptive capacities for the communities. 2. To strengthen the means to conserve the vegetation of the two existing protected forests and new areas under the Bio-corridor and ACUS categories (Toachi – Pilatón and Sarapullo, about 230,000 ha in total) (output 2).
Limited climate-related information.	To generate and disseminate hydro-meteorological information by potentiating and expanding INAMHI's hydro-meteorological network (output 6) Diffusion of best adaptive practices thanks to appropriate training (output 8), institutional learning (output 4), and diffusion of best practices through education, knowledge transfer (output 8) and lessons learnt in the project thanks to knowledge management platforms (output 9).
Difficulty of access to credit for sustainable productive activities	To work with at least 2 financial institutions supporting them to introduce specific solutions to finance adaptation (output 4). Systematically include in the credit assessment the evaluation of climate and environmental risks, aiming to integrate sustainable and climate-adapted practices in the whole operations of financial institutions. Development smart incentives for finance adaptation.

Table 7: Proposed actions to address the key barriers that limit adaptation in the lower basin of the Toachi – Pilatón water system (Río Blanco upper basin)

Project design

46. The present project will contribute to address these barriers by developing practical adaptation actions to strengthen the resilience of local communities in the upper and middle basin of the Toachi – Pilatón water system located at the Río Blanco upper watershed (i.e., subbasins 1, 2 and 3 indicated in **Error! Reference source not found.**):

    1. To conserve forest cover, to sustain the hydrological cycle and prevent as much as possible a reduction of rainfall, and to protect hillsides from erosion.
    2. To introduce sustainable farming practices to increase the yield per hectare, in order to introduce land use efficiency and sustainability and in consequence reduce the expansion of the agriculture frontier, as well as to limit soil erosion and deforestation.
    3. To mainstream adaptation into local development plans and engage the local population by increasing awareness of the impacts derived from climate change as well as for potential adaptation strategies.

47. The project targets to develop, test and implement solutions, which will be established beyond the duration of the proposed project to ensure a sustainable approach to

community- and ecosystem-based adaptation to climate change. To that end, it will incorporate successful solutions tested in comparable projects or programs in the region and elaborate solutions, which can be replicated within Ecuador and beyond.

Project / Programme Objectives:

48. The proposed project general aims at strengthening the adaptive capacity of vulnerable populations, ecosystems and hydroelectric systems in the Río Blanco upper watershed and develop a model of adaptation to climate change that can be replicated in similar context in the country and in the region. The specific objectives of the Project are:
    - Reduce the impact of climate change on the hydrological cycle under integrated watershed management approach.
    - Promote sustainable agricultural practices adapted to the new conditions of climate change and efficient technology in production processes supported by credit.
49. The proposed project aims to develop multi-stakeholder coordination and implementation mechanisms to foster ecosystem and community-based adaptation of vulnerable communities in the Río Blanco upper watershed.
50. The project focuses on key drivers that will create adverse impacts from climate change as well as on the generation of opportunities for the the most vulnerable populations. The expected mid-term impacts are improved enabling conditions to sustain forest cover and sustainable small-scale farming in the area, with a gender perspective. In the long-term, it is expected that the project's activities will result in improved adaptive capacity of the target farmers, ecosystems and hydroelectric systems. The farmers, as well as their communities, are understood as co-executors of the project and they are a key target.
51. The learning generated in the project will be structured to be replicable and to provide solutions that can be applied in other watersheds or regions in the country and even beyond.
52. It is the explicit aim of both implementing as well as executing agencies to integrate lessons learned from similar initiatives in the region and globally, and combine proven solutions in a new set-up to strengthen the global learning process on successful ecosystem-based adaptation to climate change.

Project / Programme Components and Financing:

Project Components	Expected Outcomes	Expected Outputs	Amount USD
1.Conserve vegetation cover	1. At least 230,000 ha of native vegetation is conserved to reduce the impact of climate change	1. 1,000 ha of native vegetation is conserved by sustainable forest management and conservation mechanisms.	500,000

Project Components	Expected Outcomes	Expected Outputs	Amount USD
	on the hydrological cycle under integrated watershed management	2. Improved management of existing protected forests and private conservation areas (ca. 230,000 ha)	450,000
2. Adapt farming practices to new climate change conditions and enable their sustainable climate smart financing	2. Sustainable farming practices and livestock adjusted to local realities are being introduced and implemented with assistance of financing mechanisms for adaptation measures	3. 250 ha of pasture and 250 ha of crops apply sustainable farming practices	340,000
		4. At least 2 institutions have introduced specific solutions and credit assessments to support the disbursement of credits for adaptation, integrating environmental and climate risks in their operations.	80,000
	3. At least 1 long term financing mechanisms has been piloted or introduced	5. One investment fund to promote sustainable development is set up and operational	420,000
3. Strengthen local capacities and share lessons	4. Local population and parish governments with increased capacity to implement climate change adaptation measures.	6. At least 6 parishes being built capacities and prepared to manage and use meteorological information.	160,000
		7. Six development plans of local parishes incorporate measures for ecosystem-based adaptation to climate change.	80,000
		8. Strategic plan of communication, education, knowledge transference and scheme of replica, including demonstration farms and markets. Plus training on adaptation finance to financial institutions.	120,000
		9. Systematisation of information gathered during the whole project design and implementation using existing informatics platforms	40,000
Total Component Cost			**2,190,000**
Project/Programme Execution cost			114,975
Total Project/Programme Cost			**2,304,975**
Project/Programme Cycle Management Fee charged by the Implementing Entity (if applicable)			184.398
Amount of Financing Requested			**2,489,373**

Table 8: Project framework and budget

Projected Calendar:

Milestones	Expected Dates
Start of Project/Programme Implementation	01/2020

Mid-term Review (if planned)	01/2022
Project/Programme Closing	01/2024
Terminal Evaluation	01/2024

Table 9: Project calendar

PART II: PROJECT / PROGRAMME JUSTIFICATION

A. Project components

53. The project strategy focuses on implementing actions that will minimize, as much as possible, the impacts of climate change in the Río Blanco water system as presented in Part I. The main conceptual frameworks will be a sustainable livelihoods approach (Chambers & Conway, 1991; Scoones, 1998), Ecosystem-based Adaptation[13] (EbA); Community based Adaptation[14] (CbA); and watershed management approach for climate change adaptation with a gender perspective.

54. The main rationality of the intervention on ecosystem and community based strategies is that ecosystems have strong and special influence on the vulnerability poor rural communities, while communities naturally use ecosystems to develop coping strategies to reduce their vulnerability. Rural communities depend on the conservation of ecosystem and the direct participation of communities to create ownership of adaptation strategies is key to support a sustainable intervention in the realm of climate change adaptation. Hence, this project aims to support adaptation through conservation of ecosystem and capitalizing on local knowledge and participation of local communities.

55. Conservation practices that reduce the impacts of climate change on the Río Blanco upper basin flows are based on the maintenance and management of public and private conservation areas, as well as the increase of 1,000 ha of native vegetation

56. The project is organized into three components, four outcomes and nine outputs.

Adaptation concept and indicators for Adaptive Capacity

57. The adaptive capacity of vulnerable populations defines their vulnerability against adverse climate change impacts as a function of their exposure and sensitivity to such impacts. Figure 7 visualizes the dynamics between these components. Vulnerability results as the sum of Exposure plus Sensitivity minus Adaptive Capacity[15].

[13] Ecosystem-based adaptation uses biodiversity and ecosystem services in an overall adaptation strategy. It includes the sustainable management, conservation and restoration of ecosystems to provide services that help people adapt to the adverse effects of climate change (CBD, 2009).
[14] Community-based adaptation (CbA) "is a form of adaptation that aims to reduce the risks of climate change to the world's poorest people by involving them in the practices and planning of adaptation" - Tim Forsyth, LSE - (see for example UNDP, GEF
[15] Partially taken from Christoph Jungfleisch's presentation **"**MEbA – Understanding Climate (Change) Risks, Financing Adaptation".

”Vulnerability”, means the propensity or predisposition to be adversely affected; “exposure” implies a “fixed” reality consisting in climate hazards, temperature, precipitation, soil type, etc.; “sensitivity” means a “variable” reality consisting of the inherent sensitivity of the economic activity to specific exposure, as for crop sensitivity to temperature oscillations; “adaptive capacity”, refers to the ability of a system to adjust to climate change (including climate variability and extremes), to moderate potential damages, to take advantage of opportunities, or to cope with the consequences, namely how are exposure and sensitivity managed.

58. Being exposure external and sensitivity inherent to the economic practice, ecosystem based adaptation works on increasing adaptive capacities to decrease community and ecosystem vulnerability as presented in Figure 7.

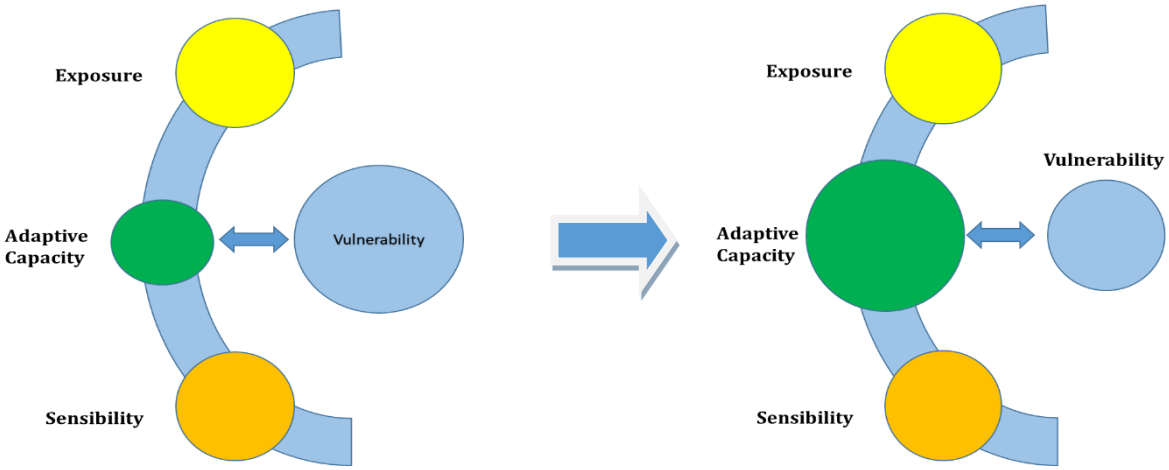


Figure 7: Influence of adaptive capacity on climate change vulnerability. Source: Engle (2011). Adapted from: Aguirre et. al. (2015).

59. The project will integrate the measurement of the adaptive capacity via established indicators that will be developed from similar approaches in the region and the national vision (MAE), mainly the National Adaptation Plan and current projects in Ecuador. A set of tools that promote the Evaluation & Monitoring and Measuring, Reporting and Verification (MRV) will also be used. The present project will build on past experiences to select the adaptations indicators tailored to the target population and ecosystem.

60. As part of the National Adaptation Plan, the country is developing a system to monitor and evaluate adaptation measures which will be taken into consideration, and if applicable, form the basis for the project’s monitoring and evaluation activities. These indicators will assess the evolution of the adaptive capacity of smallholder farmers over time. The project will promote their inclusion into day-to-day operations and promote the creation of crowd-sourced insights into the target communities’ adaptive capacity.

61. If applicable, and depending on subsequent coordination, the project will coordinate and include in its field activities the application and integration into operational processes of international best practices to measure the adaptive capacity of vulnerable populations, especially small farmers and cattle ranchers.

62. An example is the EbA capacity index developed by the UN Environment's MEbA project16, that allows institutions to address the target population to gather relevant data in three dimensions anf finally generate an index that expresses a given unit's (productive unit, household) capacity to face climate change based on Ecosystem-based Adaptation principles in three dimensions:

    - Socio-economic dimension: available infrastructure and services, financial situation and social or community integration
    - Productive dimension: status of the agricultural production with respect to soil quality, farming practices and integration into agricultural value chains
    - Environmental dimension: farm's or household's management of water, waste and pests among others

63. The gathering of relevant data will be integrated into field operations and processes wherever the project interferes with the target populations via

    - Financing activities and credit assessment
    - Provision of technical assistance to strengthen productive processes
    - Monitoring and Evaluation activities

64. Based on this data analysis process, the project will not only be able to sistemize and quantify its monitoring and evaluation activities across all field operations, but establish a system that allows for a monitoring of the evolution of farming practices in the area of the project over time, during and after the project implementation phase.

65. Resulting insights will be used to inform the communities in the area of the project via the communication strategy presented in Component 3, and hence contribute to generate relevant knowledge to be shared with the communities in the upper Rio Blanco watersheds.

66. The capacity building resulting from the knowledge sharing process will be focused on informing target populations on:

    - EbA and efficient agricultural practices that strengthen the health of ecosystems as the basis for sustainable agricultural production systems
    - Statistical analysis of effective agricultural practices under adverse climate change impact influence by combining data from weather stations in the watershed and data on applied agricultural practices s resulting from field data gathering activities described above
    - Cost-benefit analysis resulting from a close monitoring of yield levels as a function of implemented farm practices

[16] See here an overview: http://unepmEbA.org/fileadmin/user_upload/english/EbA_capacity_indexeng.pdf

- Perceptions within the community on adverse climate change impacts as well as preferred adaptation measures being implemented or carried out following the generation of crowd-sourced insights

67. The following chart and subsequent paragraphs provide an overview on the main adaptation categories and strategies that will guide the project's activities:

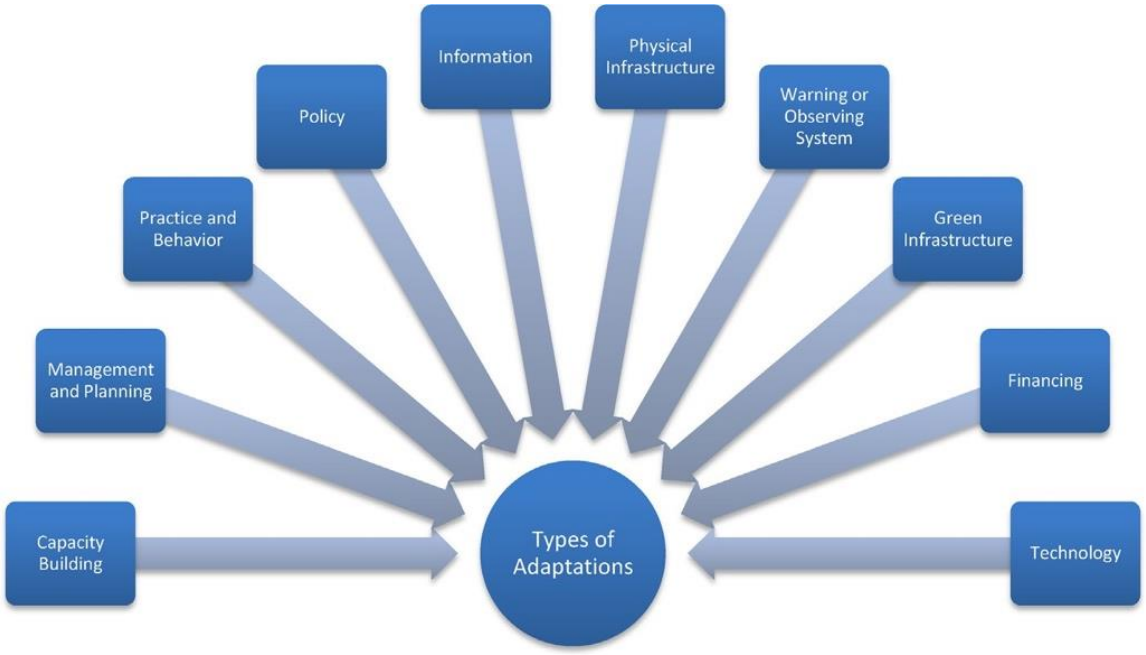


Figure 8: Adaptation to Climate Change categories, adapted from GEF, (2014).

68. The above presented adaptation categories can be specified as presented in the following table:

Adaptation category	Description	Examples of actions in category	Similar classification in literature
Capacity Building	Developing human resources, institutions, and communities, equipping them with the capability to adapt to climate change	Training/workshops for knowledge/ skills development, public outreach and education, dissemination of info to decision makers/stakeholders, Identification of best practices, training materials.	Educational/informational (Smit and Skinner, 2002; Wilbanks and Kates, 1999; Huq et al., 2003; Smit et al., 2000; Carter et al., 1994; Tompkins et al., 2010)

Adaptation category	Description	Examples of actions in category	Similar classification in literature
Management and Planning	Incorporating understanding of climate science, impacts, vulnerability and risk into government and institutional planning and management.	Developing an adaptation plan, livelihood diversification, drought planning, coastal planning, ecosystem-based planning, changing natural resource management.	Administrative/institutional/ organizational (Smit and Skinner, 2002; Wilbanks and Kates, 1999; Huq et al., 2003; Smit et al., 2000; Carter et al., 1994; Tompkins et al., 2010) Behavioral (Smit and Skinner, 2002; Wilbanks and Kates, 1999; Huq et al., 2003)
Practice and Behavior	Revisions or expansion of practices and on the ground behavior that are directly related to building resilience.	Soil/land management techniques; climate-resilient crops or livestock practices, post-harvest storage, rainwater collection, expanding integrated pest management.	Behavioral (Smit and Skinner, 2002; Wilbanks and Kates, 1999; Huq et al., 2003)
Policy	The creation of new policies or revisions of policies or regulations to allow flexibility to adapt to changing climate.	Mainstreaming adaptation into development policies, land-use specific policies, improvement of water resource governance, revised design parameters, ensuring compliance with existing regulations.	Legislative/Legal (Smit et al., 2000; Carter et
Information	Systems for communicating climate information to help build resilience towards climate impacts (other than communication for early warning systems).	Decision support tools, communication tools, data acquisition efforts, digital databases, remote communication technologies.	Infrastructural/structural (Smit et al., 2000; Carter et al., 1994) Educational/informational (Smit and Skinner, 2002; Wilbanks and Kates, 1999; Huq et al., 2003; Smit et al., 2000; Carter et al., 1994)
Physical infrastructure	Any new or improved hard physical infrastructure aimed at providing direct or indirect protection from climate hazards.	Climate-resilient buildings, reservoirs for water storage, irrigation systems, canal infrastructure, sea walls.	Infrastructural/structural (Smit et al., 2000; Carter et al., 1994)
Warning or observing systems	Implementation of new or enhanced tools and technologies for communicating weather and climate risks, and for monitoring changes in the climate system.	Developing, testing and deploying monitoring systems, upgrade weather or hydro-meteorological services.	Research and development (Smit et al., 2000; Carter et al., 1994)

Adaptation category	Description	Examples of actions in category	Similar classification in literature
‘‘Green’’ infrastructure	Any new or improved soft, natural infrastructure aimed at providing direct or indirect protection from climate hazards.	Revegetation, afforestation, woodland management, increased landscape cover.	Infrastructural/structural (Smit et al., 2000; Carter et al., 1994)
Financing	New financing or insurance strategies to prepare for future climate disturbances.	Insurance schemes, microfinance, contingency funds for disasters.	Financial (Smit and Skinner, 2002; Wilbanks and Kates, 1999; Huq et al., 2003; Smit et al., 2000; Carter et al., 1994); Market mechanisms (Smit et al., 2000; Carter et al., 1994)
Technology	Develop or expand climate-resilient technologies.	Technologies to improve water use or water access, solar energy capacity, biogas, water purification, solar salt production	Technological (Smit and Skinner, 2002; Wilbanks and Kates, 1999; Huq et al., 2003; Smit et al., 2000; Carter et al., 1994)

Table 10: Overview adaptation categories

69. The proposed project intends to address all these relevant adaptation dimensions, during its implementation.

70. For the paradigm change, Figure 9 develops the parading concepts aligned with conventional conservation and decentralized conservation measures. On the other hand, Figure 10 describes the paradigm change according with the differente components and the conventional practices and sustainable practices.

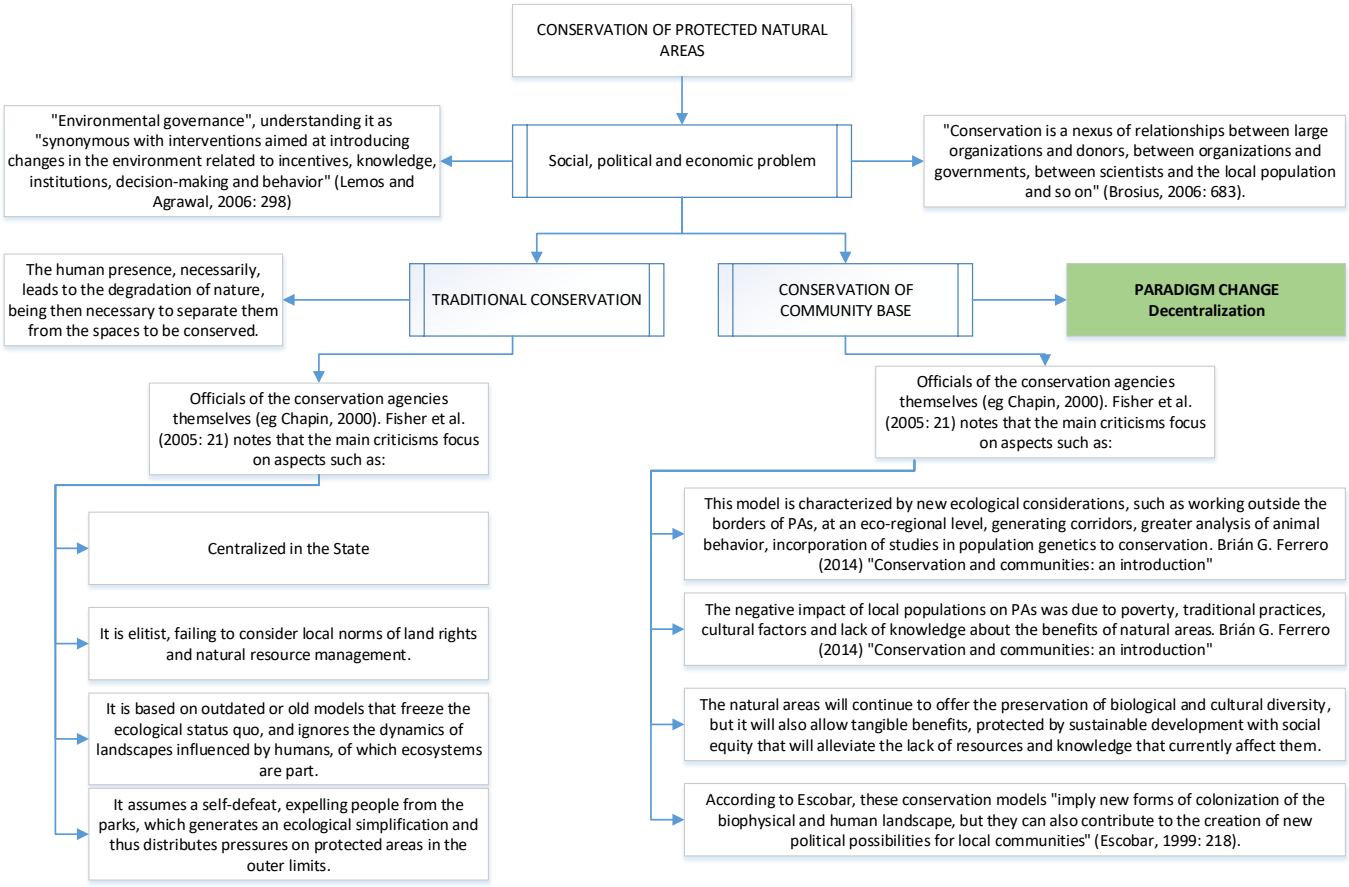


Figure 9. Parading concept, conventional conservation and decentralized conservation

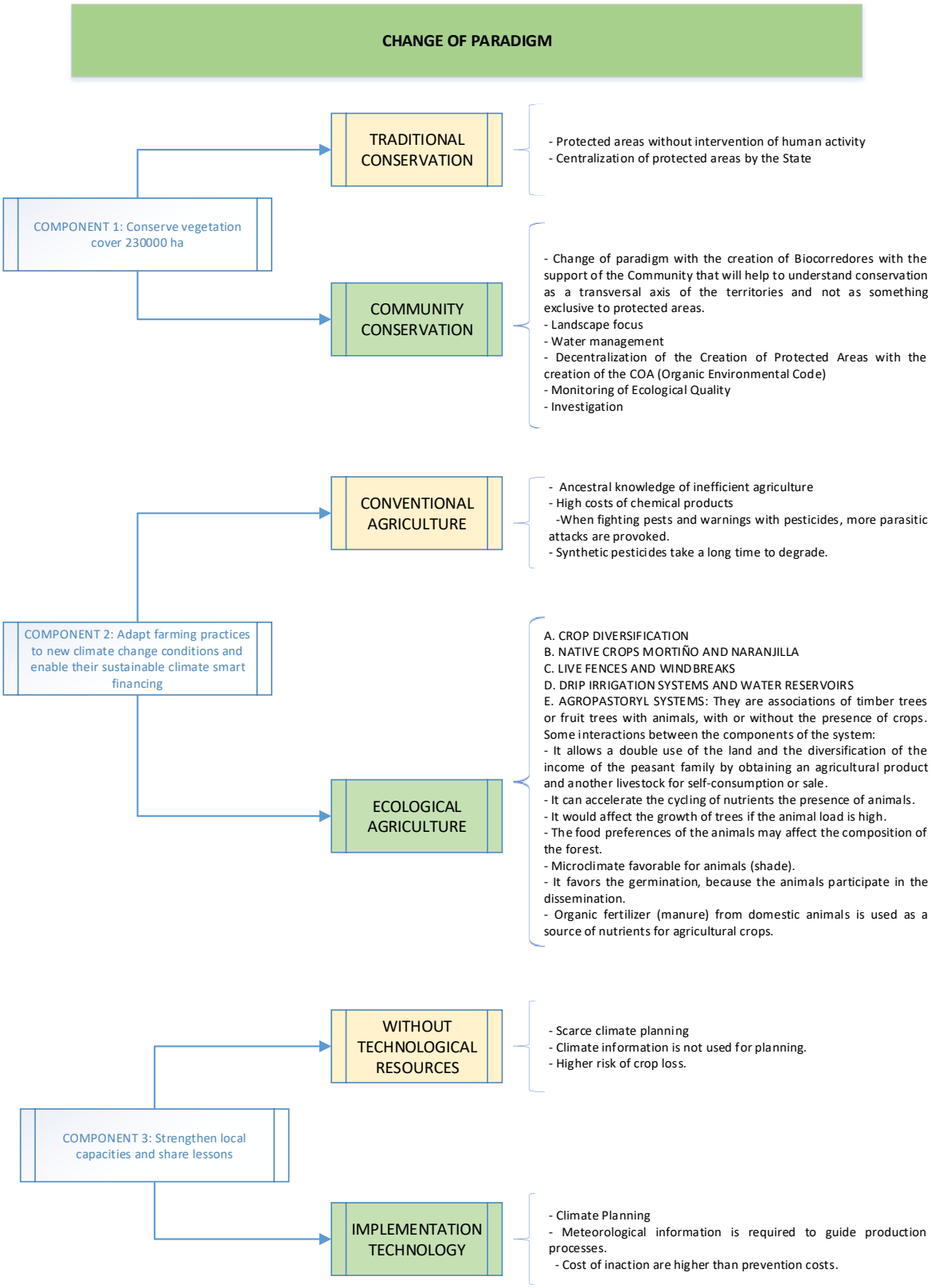


Figure 10. Parading concept, conventional practices and sustainable practices

Criteria for selecting project activities, EbA measures and co-executors

71. The criteria for the selection of the project activities was based on a triangulation methodology. The results are obtained from the interaction between documentary information, the regulatory framework, and the validation of actions with co-executors during the field workshops. In general, all components will considerate gender equality and the empowerment of women. In addition, the project will encourage the participation of women and vulnerable groups during project activities, trough the gender action plan (**Error! Reference source not found.**). The following diagrams (Figure 11) summarize project actions.

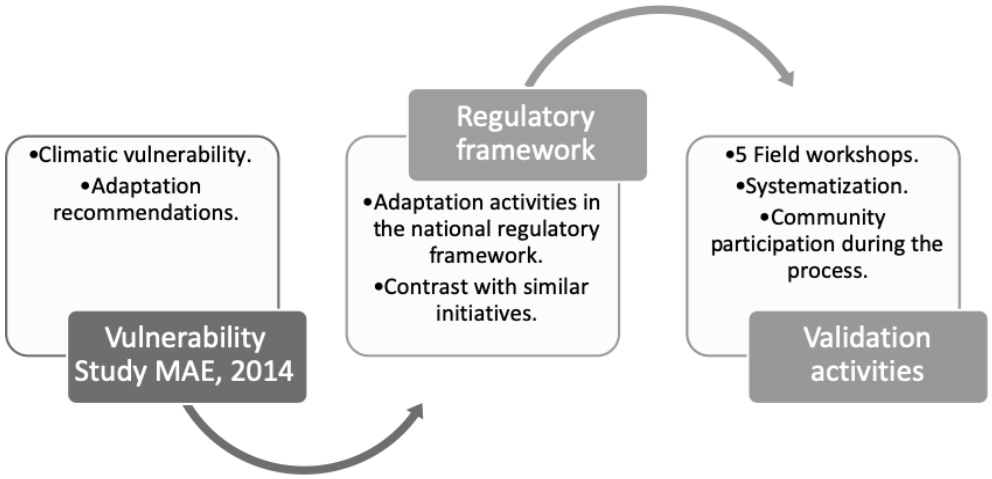


Figure 11: Methodology to define project actions

72. For the selection of co-executors, the project includes the support of a technical study (**Error! Reference source not found.**), which contains an analysis of the social and environmental conditions of the basin based in the Population Census of 2016.

73. To define the co-executors of the project, the following aspects will be considered:

- Location of defined villages to participate.
- Obtain population data of each point in relation to the census sector where it is located.
- Vulnerable areas.
- Location of the measurements.
- Deforestation 2014-2016 and
- Data of the 2010 population census (INEC).

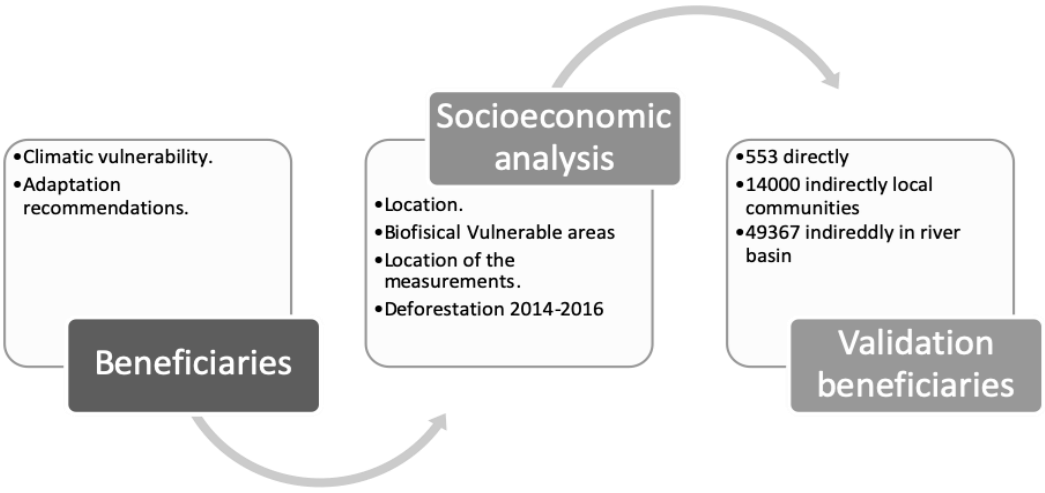


Figure 12: Methodology to define beficiaries

74. The criteria for prioritizing co-executors includes the vulnerability to climate change and social vulnerability. The criteria also considers the socio - demographic - economic factors facing the beneficiary population, by linking the characteristics of the population such as poverty, indigenous groups, minorities, disabled people and gender.

75. The social vulnerability index (SVI) is a measure proposed by the UNDP that refers to the the circumstances that affect population groups, which limits their ability to fend for themselves. The factors associated with social vulnerability expressed as demographic indicators that make up the SVI are the following:

    - The number of illiterates is an indicator of the level of delay in the educational development of a society, especially in the case of the most vulnerable groups of the population; hence the importance of associating this indicator with variables such as residence, ethnicity, age group and sex.
    - Malnutrition is a multi-causal phenomenon directly associated to: deficiencies, excesses or imbalances in the diet; inadequate cultural habits; precarious health services; to a poverty that limits access and capacities to acquire food; as well as marginalization that does not allow access to food, among other factors
    - The incidence of poverty refers to the deprivation of people or homes in the satisfaction of their basic needs.
    - Infant mortality, which consis on the probability that children have to die during their first year of life.
    - Ethnicity refers to the cultural values and practices that distinguish groups or communities.

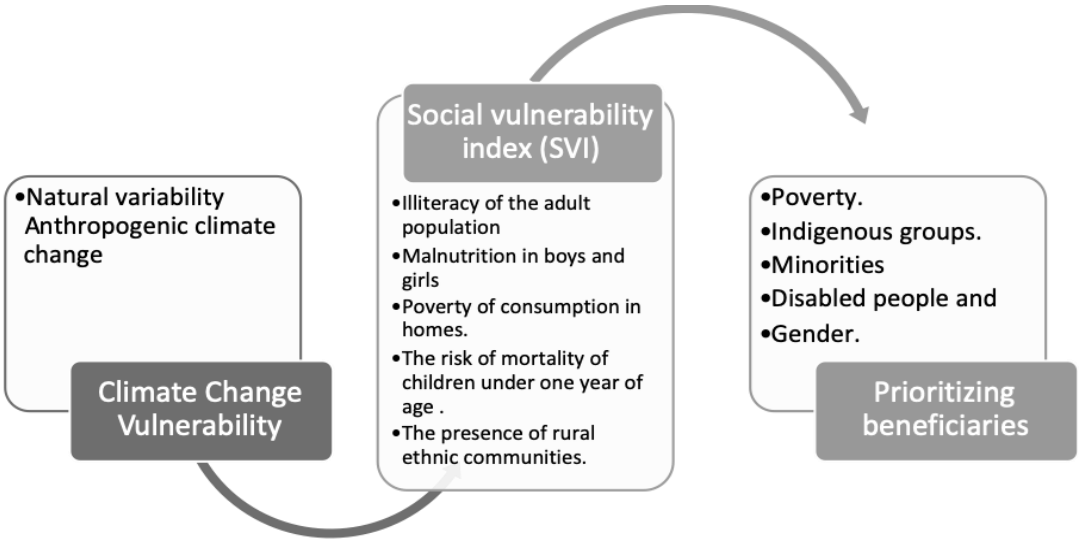


Figure 13: Methodology to define co-executors

Criteria for selecting project EbA measures

76. EbA measures are generally cost-effective. In addition to their role in reducing vulnerability and increasing the resilience of biodiversity, they tend to generate valuable additional benefits such as: disaster risk reduction, maintenance of livelihoods and food security, carbon sequestration, water availability. On the types of agricultural practices that will be considered for the deployment in the target areas, the selection criteria of adaptation to climate change based on ecosystems will be taken with the purpose of:

- Reducing the pressure on the ecosystems and the services they provide.
- Increasingthe social or economic resilience of human populations vulnerable to climate change.
- Reducing risks associated with climatic events in productive activities.
- In its implementation, protect, restore or use biodiversity and ecosystems of sustainable way.
- Generating positive impact on the economy of people in the short term.

The following adaptation measures have been reviewed and identified as potential solutions to be implemented with local populations in the Río Blanco upper watershed. Their selection has been done on an "*a priori*" basis and was drawn from the UN Environment MEbA project's catalogue of 40 EbA measures as published on the respective website. View **Error! Reference source not found.**

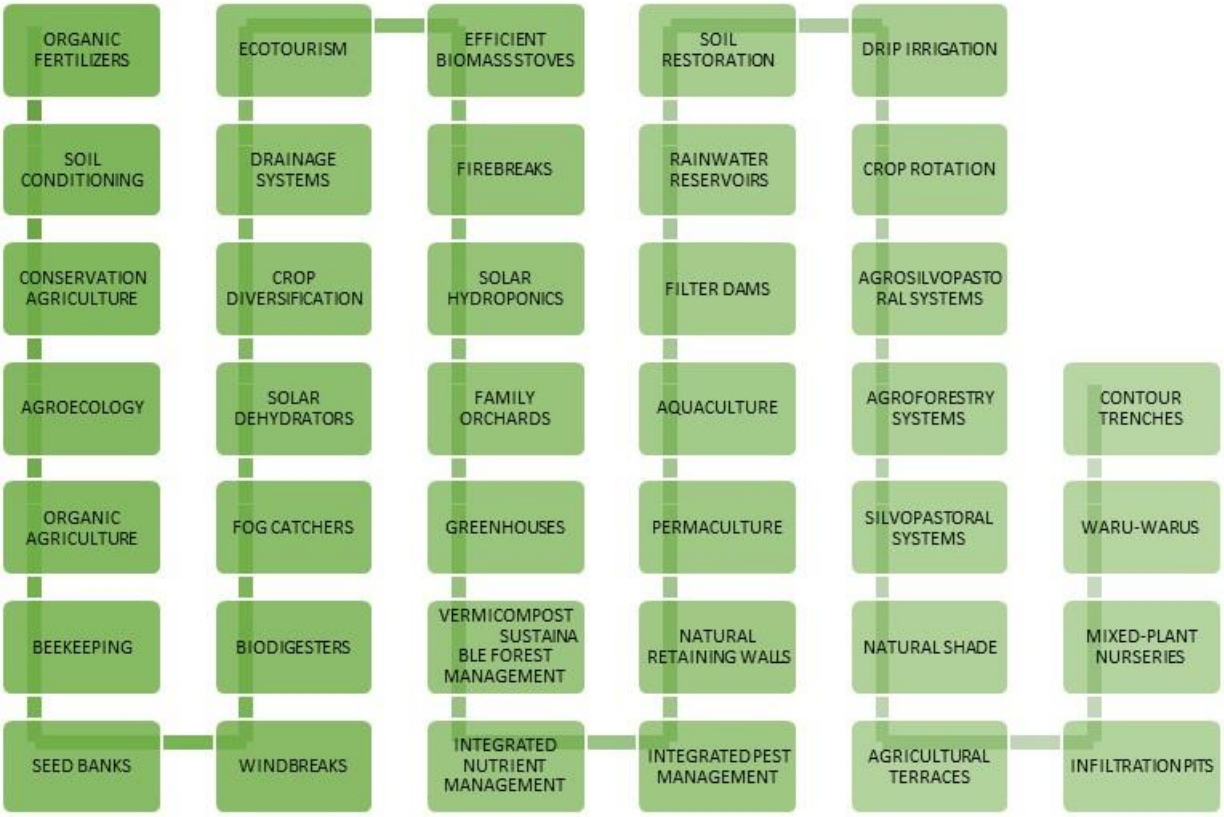


Figure 14: EbA measures Catalog (40)

77. According with the arrangements (Part III, A): the Ministry of the Environment,; Water Secretariat (SENAGUA); CELEC Hidrotoapi; local GADs; and local institutions such as the Ministry of Agriculture, Consortium of Provincial Councils of Ecuador (CONCOPE) and National Meteorological Institute (INAMHI), have a key role for the success of the project.

Theory of change for addressing the deforestation driver component 1:

78. The ACUS conservation mechanism offers an integral approach in terms of combining land preservation activities while supporting the livelihoods of local inhabitants. An enhanced land management allows combining preservation measures, farming practices, provision of ecosystem services while at the same time preserving biodiversity and improving the livelihood conditions of farmers located in the forests. As mentioned before, currently the main economic activity of local inhabitants is the production of panela, which has caused a high level of deforestation due to the large amount of fuelwood that is unsustainable used. For this reason, the project is proposing to strengthen farmer's capacity in agricultural sustainable practices which will produce better yieldsbut at the same time preserve their forest. Improving crops and production implies a risk of expansion to continue growing their incomes. That is why the project presents a strong capacity building

component to train local farmers about the importance of ecosystems and its preservation and to raise awareness about the risks that implies degradation exacerbated by climate change. It is important to mention that this process will be closely and constantly adviced and guided by project technicians. The permanent technical advicetogether with a strong and effective monitoring and evaluation system will minimize the risk of encroachment.

79. In a region where a high percentage of the population lives in poverty, to provide help for conservation is necessary, but what would create a long-term larger impact is to provide them with economic alternatives to improve their socio-economic conditions. Based on the type of activities that communities have been practicing until now, it is clear that their main priorities remain related to improving their socio-economic conditions.

Component 1: Conserve vegetation cover

Project Component	Outcome	Outputs	Amount USD
1.Conserve vegetation cover	1. At least 230,000 ha of native vegetation is conserved to reduce the impact of climate change on the hydrological cycle under integrated watershed management	1. 1,000 ha of native vegetation is conserved by sustainable forest management and conservation mechanisms.	500,000
		2. Improved management of existing protected forests and private conservation areas (ca. 230,000 ha)	450,000

Table 11: Overview component 1.

80. Component 1 focuses on the conservation of vegetation cover on an area of 230,000 ha, supported by the introduction of the sustainable forest management and conservation technologies.

81. The measures related to forest conservation, afforestation and climate monitoring, were identified as a result of the study "*Analysis of the vulnerability of the hydroelectric power plants prioritized for the effects of climate change, Toachi Pilaton hydroelectric power plant (2014)",* developed by the Ministry of Environment of Ecuador. In this analysis, a series of activities related to adaptation are recommented to maintain and improve the provision of ecosystem services in the upper basin of the Blanco River (**Error! Reference source not found.**).

The adaptation recommendations identified in the study have the following characteristics:

- Conserve the forests and protective vegetation, as well as anthropized ecosystems corresponding to the Blanco River upper basin.
- Control of erosive processes and sediment flows.
- Regulate the ecological cycle to optimize the available water resources and its hydroelectric use.

- Sensitize and strengthen the capacities of local governments and related communities.
- Make the socio-economic development of the sub-basins compatible with the preservation of water resources. Promote the restoration and enrichment of the páramos and forests, maintaining a continuity of the Andean ecosystems and their ecological services.

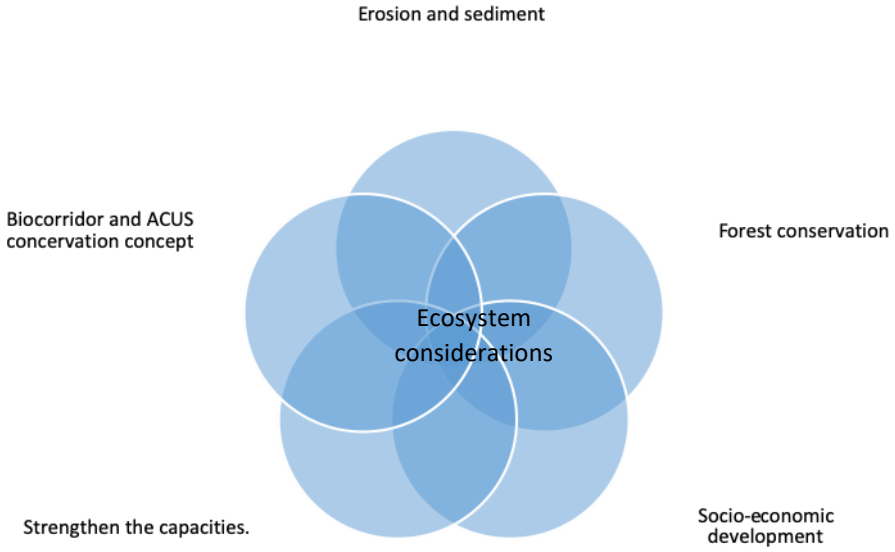


Figure 15. Key Concepts identified with the local communities for the component 1.

82. The identification of the intervention area follows the methodologies developed by the Ministry of the Environment through the Operational Manual of the Socio Bosque Mechanism[17] and are detailed in the ministerial agreements: N° 130 on 28 June 2011.

83. The Socio Bosque National Mechanism in its new vision for the 2017-2022 period, changes the conventional concept of conservation for the landscape management approach, focusing on three main drivers such as conservation, governance and community landscape management.

84. In the ministerial agreements there are defined the criteria for eco-system services, socio-economic characteristics and preassures, hydroclimatic threats. In a more detailed perspective this can be exemplified as:

    - Historical patterns of deforestation related to poverty level;
    - Hydroclimate and climante variability extreme events threats (droughts, floods) to the biophysical components of the basin;
    - Loss of environmental services such as; biodiversity sanctuary, hydrological regulation and carbon storage system;
    - Threat levels defined through the proximity to access roads;

17 http://sociobosque.ambiente.gob.ec/files/MANUAL%20OPERATIVO%20SB%20UNIFICADO%202012.pdf

85. In addition, information and similar interventions in the territory will be identified as they emerge to complement and not duplicate efforts within project activities.

86. Table 12 presents the information of the Socio Bosque Mechanism activities, which will be complemented with the activities of this project proposal of Biocorredor and will be considered as part of Areas of Conservation and Sustainable Use (ACUS)[18]. ACUS is an area created by the decentralized governments, communities or private owners of local importance whose purpose is the conservation of biodiversity and the development of sustainable activities. Areas of Conservation and Sustainable Use of Biodiversity will be those of property of decentralized autonomous governments, of communities or of natural persons or legal systems that contribute to the conservation of biodiversity.

87. The landscape approach was recently introduced in Ecuador with support of the Global Environment Facility (GEF) in the project "*Advancing Landscape Approaches in Ecuador's National Protected Area System to Improve Conservation of Globally Endangered Wildlife"*. This iniciative provides the following recommendations:

    - The integration of the "advancing landscape approaches" for the conservation of biodiversity in protected areas,
    - Promoting the conservation of biodiversity through the generation of normative instruments,
    - Capacity building and monitoring,
    - Biological monitoring of flora and fauna,
    - Creation of conservation areas and generation of sustainable productive activities.

Socio Bosque Mechanism			
Surface (ha)	**Characteristics**	**Number of co-executors in the area**	**Average surface per beneficiary**
10.959,83	Individual co-executors	93	117 ha/beneficiary

Table 12: SocioBosque interventions in the Rio Blanco watershed

88. Component 1 intends to promote the biological and functional connectivity, -is important to mention that the hydroelectric plan is downstream of the project intervention area.

89. In **Figure** 16, Figure 16. Biocorridor scenarios: localization, vulnerability and ecosystem selection, cost.Map 1 presents the location of the project area that was obtained from a section of hydrographic area and from the parishes. Map 2 and 3 show the methodology of identifying the priority restoration areas which will be the biocorridors selected territory. This will allow community productive activities to generate ecological connectivity without affecting the territorial approach. The

[18] Process that is ratified in ministerial agreement No. 083 of August 30, 2016 on "Procedures for declaration and management of protected areas in Ecuador".
http://suia.ambiente.gob.ec/documents/10179/346525/Acuerdo+Ministerial+083+Subsistemas.pdf/f17bbb62-518e-43db-b24e-65a0a8f1c0ac

approximate restoration cost (obtained from the Ecological Restoration Program of the Ministry of the Environment approximately) is $ 261 dollars per hectare.

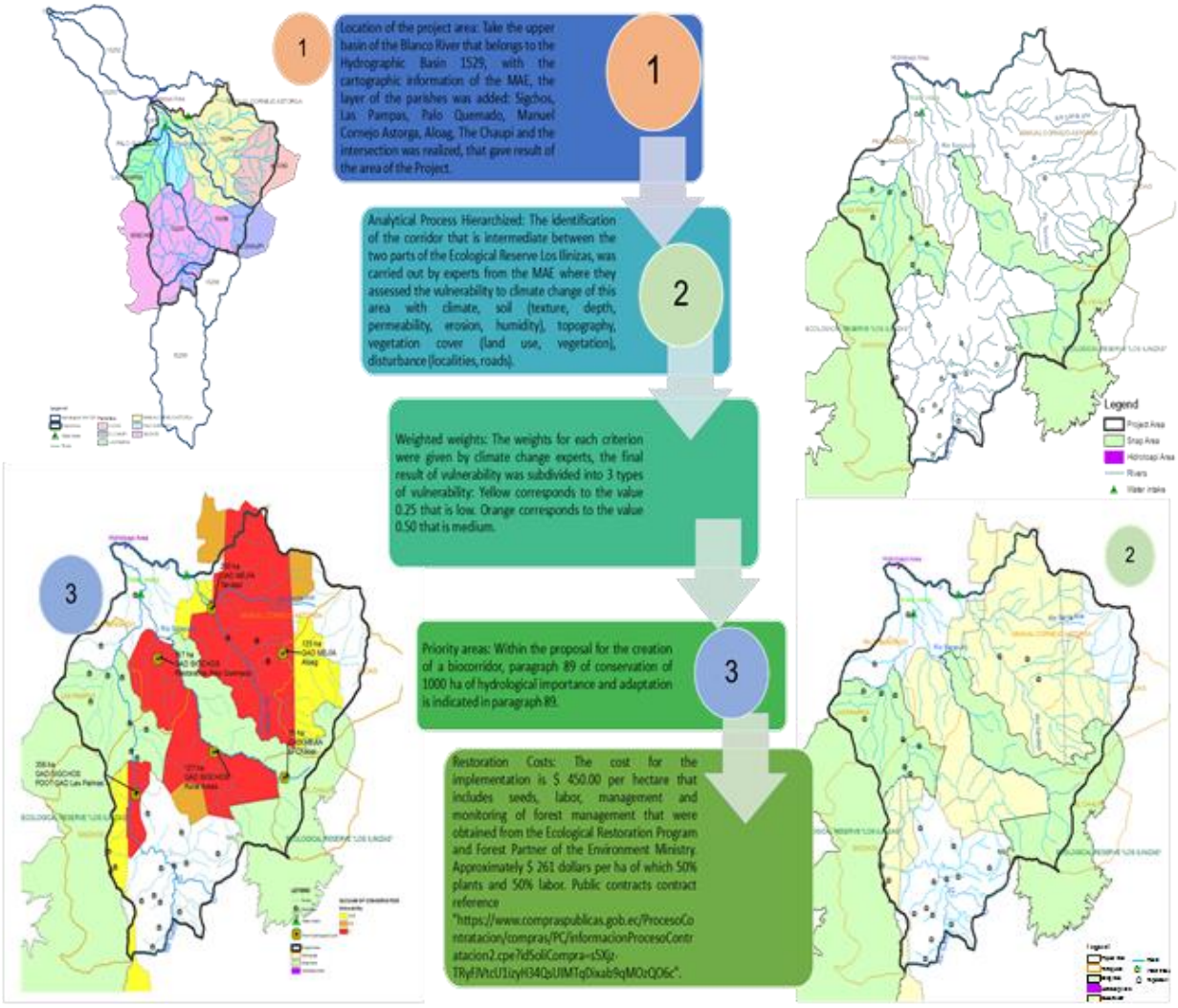


Figure 16. Biocorridor scenarios: localization, vulnerability and ecosystem selection, cost.

90. Component 1 hence has a direct relationship between conservation and forest management in priority areas, mainly those with a high natural forest and low inhabitants index, under an integral concept of Bio-corridor and watershed management in the upper part of the river basin. Figure 17, presents the priority areas:

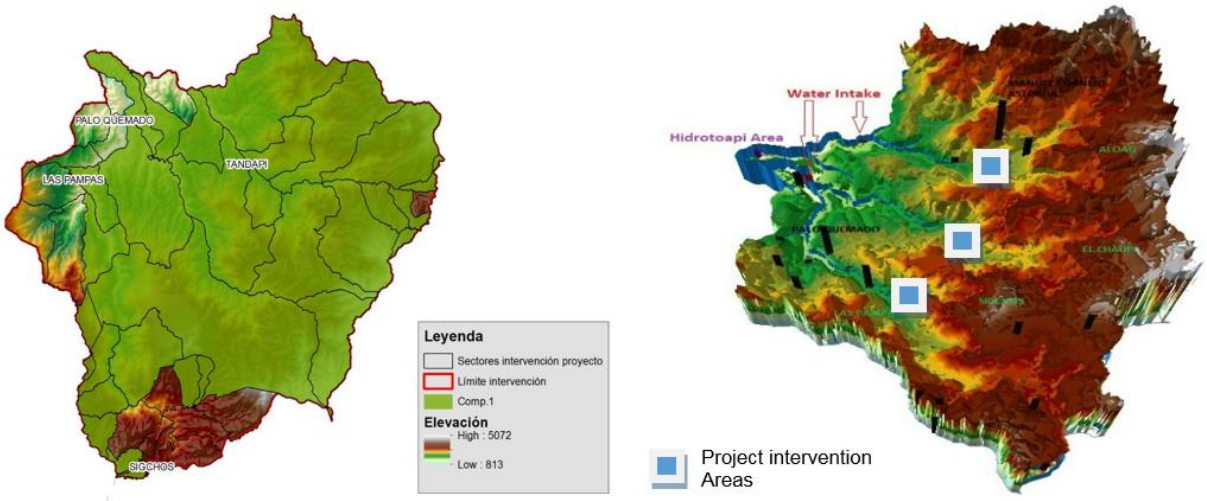


Figure 17. Priorities areas for the component 1, conservation and forest management in the Río Blanco upper watershed.

91. The project will coordinate with the following key stakeholders the execution of component 1 that have been identified and engaged in the project planning and preparation phase (see **Error! Reference source not found.**; **Error! Reference source not found.**).

Stakeholders	Functions	Project Implementation Role
Ministry of Environment (MAE)	Lead institution of the environment sector. Local staff of the PAs Unit are responsible for planning, management, vigilance and control within PAs.	National environment authority. Project - executing institution, will lead project activities in relation to the formulation of norms and strategies, the clarification of institutional roles for forest and AP management and conservation, support to GADs in processes of territorial land use planning, and support to incentive systems.
Ministry of Agriculture and Livestock (MAG)	Regulation, facilitation, control and evaluation of management of agriculture, livestock, promotion of actions which allow rural development and further the sustainable growth of the production and productivity of the sector.	Provision of training, technical assistance and monitoring of sustainable agriculture and livestock production
National Planning Ministry (SENPLADES)	Coordination of National Decentralized System for Participatory Planning, promotion of integrated development.	Coordination and consultation regarding the project's support to territorial land use planning processes and the GADs.
GADs	Generation of development and land use plans, for environmental management, declaration of parish and municipal protected areas, formulation of local environmental norms and the implementation of sustainable natural resource management projects.	Key targets for strengthening due to their responsibilities for environmental management at parish and municipal levels. Promote and support the investment fund as constituents

National Police Environmental Unit	Control of compliance with environmental norms in order to avoid its degradation of disappearance.	Guidance on application of legislation: involvement in multi-stakeholder strengthening of governance conditions.
SENAGUA	Water management authority, is an essential partner for the basin committees conformation and the investment fund.	Promoter on the River basin council.
Local communities and associations.	River basin management and zoning plans under an Integrated Watershed Management	River basin planning and implementation of Project activities.
INAMHI	Authority in the climate information generation.	Hydro-meteorological and decentralized monitoring system development.
FAO	Valuing and conserving biodiversity for food and agriculture and promoting its use in support of food security and sustainable development worldwide for current and future generations.	Executing entity

Table 13: Key stakeholders in the Rio Blanco watershed

Outcome 1. At least 230,000 ha of native vegetation is conserved to reduce the impact of climate change on the hydrological cycle under integrated watershed management

92. The objective of this outcome is to encourage conservation of the existing forest cover by promoting the conservation of 1,000 ha of native vegetation (output 1) and strengthening the management of the existing protected forests (ca., 230,000 ha) (output 2) based on two existing and proven mechanisms developed in the country: ACUS and Socio Bosque (**Error! Reference source not found.**).

Output 1: 1,000 ha of native vegetation is conserved by sustainable forest management and conservation mechanisms.

93. The activities targeting this output will promote the conservation of 1,000 ha of native vegetation that contribute to the regulation of the hydrological cycle, and which are not currentlyprotected by any measure.

94. Strengthening governance among different stakeholders within the area of intervention is a key factor for the sustainability of the project by the empowerment of the local communities. At the beginning of the project, they will play a role as co-executors, but the long-term intention is that they become active participants and lead the conservation process.

95. This component is based on the advancing and holistic landscape approaches implemented by the Ministry of Environment: ACUS mechanism under the Bio-

corridor category. The concept will be widely applied with the active participation of local stakeholders.

96. The biocorridor surface under the conservation category ACUS includes 1,000 ha of;

- Hydrological and ecosystem importance,
- Sites identified accordingly to the Territorial Organization Plans (PDOT for its Spanish abbreviation -table 11) and;
- The vulnerability to climate chage analyses (CHECC).

Protected area name	Area in the Project (ha)	PDOT	Main Activities	Indicator
GAD Sigchos-Las Palmas Conlindaciones[19] de Sarapullo, Triunfo Bajo, Monte El Triunfo secondary Forest	356	Non-available	Updating of several Plans in the area according the National Laws (ACUS) -Execution-Management Plan -Management Model -Finance strategy	Management Plan and ACUS
GAD Sigchos Restoration in Palo Quemado	117	ACUS proposed	restoration	ACUS
GAD Sigchos rural areas	127	Recuperation Area	restoration	restoration
GAD Mejia –Tandapi	200	ACUS	restoration	Laws and ACUS
GAD Mejia –El Chaupi	75	ACUS	restoration	Laws and ACUS
GAD Mejia –Aloag	125	ACUS	restoration	Laws and ACUS

Table 14: Priority interventions ACUS in the Rio Blanco watershed

97. Figure 18 map 1 presents the location of the project area that was obtained from a section of hydrographic area (No.1529) and from the parishes. Map 2 and 3 show the methodology for theidentification of the priority restoration areas that will be considered for the biocorridors, which will allow community productive activities to generate ecological connectivity without affecting the territorial approach.

[19] PDOT GAD Las Palmas

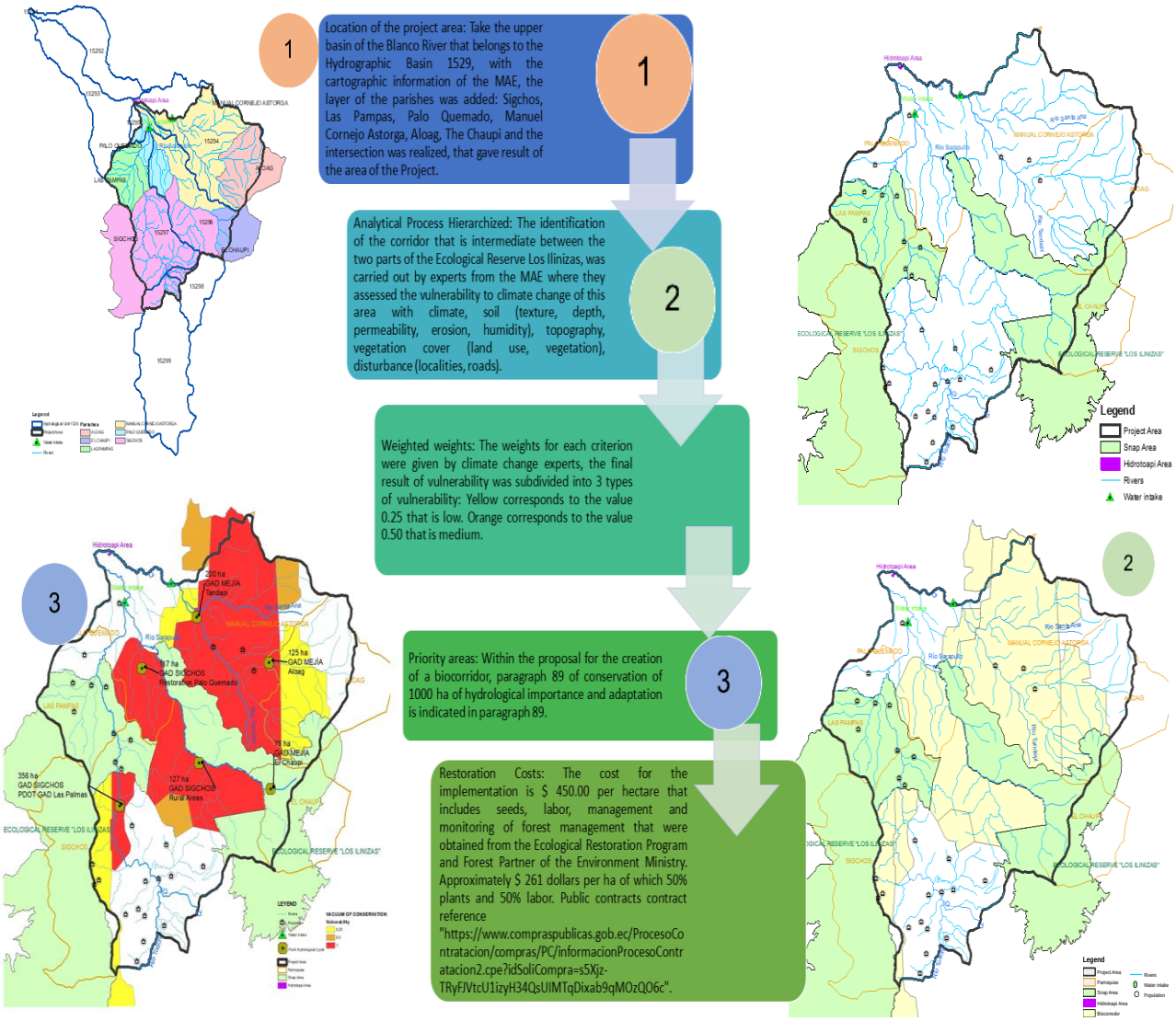


Figure 18: Biocorridor scenarios: localization, vulnerability[20] and ecosystem selection, cost.

98. In general, the proposed areas have had an important deforestation process. In the period 2008 - 2014 the deforestation surface was 5891,33 ha., and the following period 2014 - 2016 the deforestation increased by 2200,14 ha. In total 8091 ha (2008 – 2016) have been affected in the watershed (Figure 19). The project will promote the restoration of importance areas thought the component 1.

[20] Analysis of the vulnerability of flagship hydropower plants to the effects of climate change (CHECC), in particular the results for the Toachi-Pilatón hydropower plant

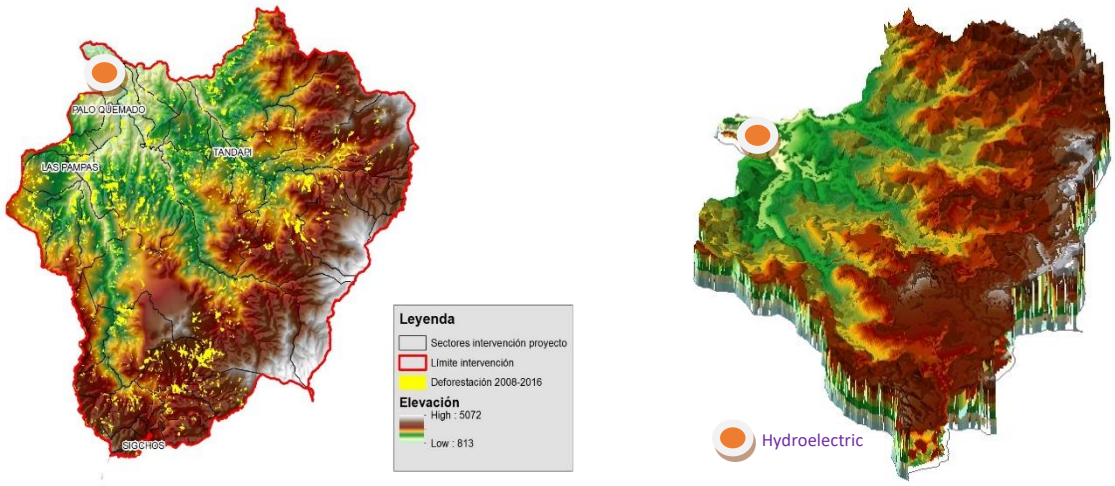


Figure 19: Accumulated Deforestation 2006 – 2016 and ramp in the Río Blanco upper watershed

99. The main way forward the output is the Municipal – Parish PAs, covering 1,000ha, in buffer zones and corridors identified as critical for reducing the impact of climate change on the watershed´s hydrological cycle. The new areas for conservation will be identified in order to develop protective forest management plans and formalize through signed agreements. The plan will include ravine and shore protection activities. The intention besides protecting some areas is to recover some degraded areas where necessary.

100. The project team, working closely with MAE representatives at central and local levels, will provide local authorities (GADs) with guidance on the establishment of such reserves, in accordance with the Norm on the Subsystem of Decentralized Autonomous Governments (GADs) – Municipal Protected Areas [21]. This guidance will cover aspects of location and design, in order to maximize the potential of these reserves to contribute to connectivity and habitat value of the areas. The potential benefits for local water supply and the avoidance of environmental risk that may be generated through the establishment of municipal reserves to protect riparian forests and those around water sources complement conservation objectives.

101. The ratings of management effectiveness tracking tool and the Annual Operational and Management Plan in Protected Areas - PGOA22 will be increased by applying the evaluation system of of the Management Effectiveness Tracking Tool (METT)23.

102. The METT tool has been developed by a cooperative effort of the World Bank and the World Wildlife Fund (WWF). It is a simple, cost-efficient and flexible tool that can give a quick overview of the effectiveness of protected area management without requiring expensive consultants or taking up too much time for managers, rangers or others responsibles for governance. The METT is usually run as a qualitative

[21] Agreement No. 168, MAE, Official Register 319 of 12th November 2010 (Norm on the Subsystem of Decentralized Autonomous Governments (GADs) – Municipal Protected Areas).
[22] Acronym in Spanish for Annual Operational and Management Plan in Protected Areas
[23] Management Effectiveness Tracking Tools Matrix developed for Protected Areas by The United Nations Development Programme GEF adopted by Ecuador Government for AP management: http://suia.ambiente.gob.ec/documents/10179/346525/Gu%C3%ADa-Metodol%C3%B3gica-Evaluaci%C3%B3n-de-EfectividadManejoPatrimonio%C3%81reas-PG.pdf/8cd4223b-954a-42df-8b73-3490831a61c2

assessment and relies largely on the judgment and honesty of the assessors. Nowadays, the METT system is institutionalized and reported - updated every year, being accessible to the public users through the MAE website, System of Biodiversity SIB. In Ecuador, the application was introduced in 2008[24].

103. It is expected that, given the holistic and participatory approach applied in the ACUS and Bio-Corridors, it can be useful to demonstrate and exemplify the benefits of applying a sustainable land management approach, so that it can motivate the current co-executors of Socio Bosque to gradually adopt or replicate this approach in the near future. This output will be complementary to Socio Bosque program which, at the moment, is focused on conservation, but it does not intend to finance SB program.

104. At the moment, the use of wood to produce “panela” represents the main driver of deforestation in the area. In this component, the approach about alternative forest energy to reduce pressures on native forest resulting from panela production will be carried. For this purpose, the governance mechanisms were addressed with the aim of reducing local people’ motivations to cut down the forest. Through the ACUS approach, it will focus on the improvement of sustainable forest management, introduce alternative and innovative technologies, e.g. equipment such as efficient sugar mills and ovens, in order to demonstrate their technical viability, financial sustainability; including supporting the access to markets for their products.

105. Farm plans will be developed, promoting always at least 50% of women’s active participation. It is necessary within this component to strengthen local communities’ capacities on planning strategies, conservation practices and climate change. For this purpose, a cross-sector program for awareness raising and communication is considered as detailed under Component 3.

106. This component will work also on strengthening the hydro-meteorological system of the Río Blanco upper basin. Now, there are eleven hydro-meteorological stations, from which, only two are working properly. The intention will be to strengthen and improve the existing equipment determining its priorities and the purchase of four automatic hydro meteorological new equipment, will be considered under technical criteria in coordination with INAMHI and CELEC; the strategic localization will be responding the final design of the integral climate monitoring system. The managing of the hydro-meteorological system and use of the information generated, is under output 6.

Output 2: Improved management of existing protected forests and private conservation areas (ca. 230,000 ha)

107. This output will strengthen the institutional and legal frameworks to manage the Toachi – Pilatón (ca., 212,000 ha) and Sarapullo (ca., 21,000 ha) protected forests,

[24] METT tracking tools for Ecuador system: http://suia.ambiente.gob.ec/documents/10179/346525/Gu%C3%ADa-Metodol%C3%B3gica-Evaluaci%C3%B3n-de-EfectividadManejoPatrimonio%C3%81reas-PG.pdf/8cd4223b-954a-42df-8b73-3490831a61c2

as well as existing private reserves[25]. Currently these areas do not have management strategies and are under pressure to be converted into extensive farming lands. Due to their particular natural conditions and location, the mentioned forests are vulnerable to adverse climate change effects, resulting in possible desertification and water caudal reduction.

108. From the perspective of ecosystem and communities based adaptation, it is necessary to strengthen the conservation of areas that remain in good condition as an adaptation measure with a lower long-term cost. The conservation of protected forests and private reserves contribute to maintaining connectivity between local and national conservation areas, both public and private, and all related climate and hydrological regulation services, such as sediment retention, infiltration and interception of horizontal rain, ravine and shore protection, very important in these mountainous areas.

109. To protect these areas, the status of the protected forests will be assessed, and safeguarding strategies will be designed with local partners interested in supporting the conservation of the standing forests. It is expected that interested parties contribute to the long-term conservation of these areas. This point will be complemented with other existing programs such as Socio Bosque and its different components, trying to change the paradigm of conservation though concepts and tools such as the investment fund.

110. Possible partners may include parish governments, municipalities, provincial governments, HIDROTOAPI, water companies, SENAGUA and the Ministry of Environment. As mentioned before, the feasibility of establishing an investment fund was analysed during project preparation.

111. In this output, the project will support a paradigm shift in the management of the Protected Areas system from the existing site-focus to one that adopts an integrated landscape-watershed integrate management approaches under the bio-corridor concept. This could help to improve habitat and conservation of natural heritage in benefit of the caudal in the Toachi-Pilaton Hydroelectric project, trying to improve the internally fragmented and disconnected across the broader landscape, with negative implications for water resources.

112. The processes of decentralization in the creation of protected areas and their management (ACUS) through local governments, allows to mainstream the criterion of landscape management, the strengthening of local capacities and the deconcentration of competences in the environmental management while ensuring a more efficient way to create protected areas.

113. By transfering more competencies to the local GADs in determining protected areas and ensuring capacity building of its respective management, the project is aligned with the general orientation of the government while building its activities upon tested and proven methodologies and activities.

[25] On the first screening three private reserves were identified: [1] Reserva de Bosque Integral Otonga (1,000 ha), [2] La Hesperia Reserva Natural (814 ha), and [3] Reserva Florística Río Guajalito (1,000 ha). During project implementation an in-depth analysis will be done, because it is very likely that more private protected areas exist.

114. The component will further strengthen the capacities of PA institutions and local governments to apply an integrated landscape and watershed management approach for forest conservation into their management procedures and planning processes focusing in the formal conservation categories.

115. The project will work with the existing programs and categories of the law on bio-corridors and ACUS, with the aim of promoting the mobilization of additional resources from private landowners for the creation, restoration and/or protection in areas of importance for biological, productive and water regulation.

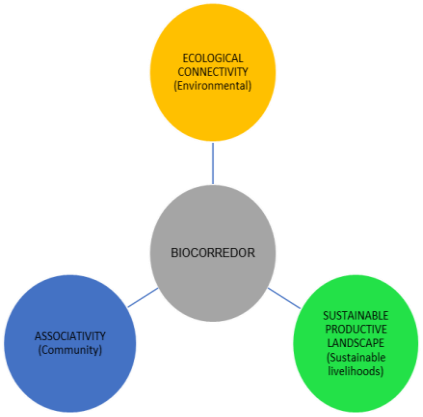
116. According with the Territorial Land Use Plans (PDOT) of the local governments the proposed areas are:

Protected area name	Area in the River Basins (ha)	Areas in the project (ha)	Date of creation	Management plan date	Main Activities	Indicator
Los Ilinizas[26]	29,672	8,901	11-12-1996	2008	Implementing Management Plan	METT 70/100
Ecological Reserve	12,234	3,670				
Bosque [27]protector Sarapullo	21,585	17,268	30-07-1986	N/D	Update of Management Plan	METT 70/100
Bosque protector Toachi Pilatón	212,000	169,600	14-09-1987	N/D	Update of MP	METT 70/100
GAD Sigchos	16,307	16,307	Degraded	ND	Restoration	# of ha
GAD Mejia	5,021	5,021	Moderate forest intervention	ND	Conservation priority	# of ha
GAD Tandapi	2,5042	9,232	Conservation priority area	ND	Conservation priority	# of ha

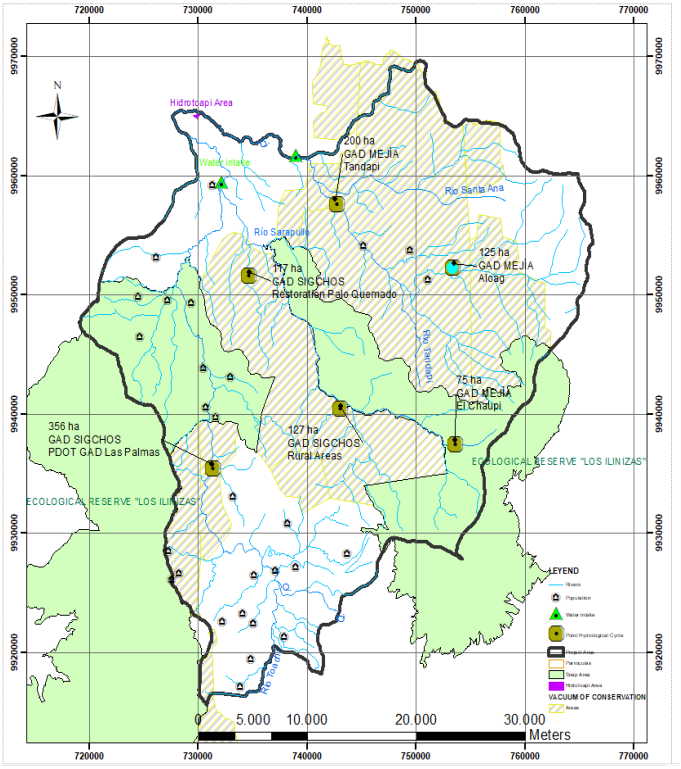
Table 15: Protected Areas according local PDOT in the Rio Blanco watershed

[26] http://www.undp.org.ec/licitaciones/2014/001/Anexo1-PM%20ILINIZAS.pdf
[27] PDOT GAD Sigchos 2015.

The Biocorredores are areas of the territory where ecological connectivity is recovered, articulating fragmented habitats, incorporating into the landscape sustainable productive activities and fostering associativity. It seeks to extend intervention strategies to a larger territory, expanding the impact of the work of communities and other social and institutional actors with a gender focus.



The main problem with invasions is that there is no land tenure study. Land tenure is the first product that will be developed within the adaptation project to ask the environmental authority for the creation of the biocorridor, with this document it will allow the provincial GAD to have a resource for the control of land use.



It is proposed to implement the creation of a Biocorridor in the space not considered by the Ecological Reserve Los Ilinizas under the legal regulations of the COA (Organic Environmental Code of Ecuador) as can be seen on the map.

Figure 20. **Biocorredor 230.000 ha concept**

117. To address the concerns of of deforestation and invasions in protected aeas, three aspects are managed in this output:

- The *Organic Code of the Environment* (hereinafter, "COA") is currently the most important norm in the country in environmental matters. It entered into force on April 12, 2018 and addresses issues such as climate change, protected areas, life wild, heritage, land use, among others. Regarding invasions in protected areas, the regulation stipulate the creation of biocorridors where ecological connectivity, a sustainable productive landscape and the associativity of communities can interact.
- Internalization of the damage caused by the invasions to the communities of the project area. It is expected that comunnities are involved in the protection and and control of land use.
- Knowledge generation; which will be developed ini component 3 strengthen learning.

118. The wildlife and forest traffic control capacities will be strengthened in the Tandapi control point and a second control point will be included during project inception. The selection will be done in accordance with the National Police and Protected Areas (ACUS).

119. The National Police for Environmental Protection Unit (UPMA) has undertaken a review on control and regulation of the forest management and use: the entities of the central government that are involved in the control of illegal hunting and logging are the Ministry of Environment (MAE), through the Forestry Control and Wildlife Unit and the Interior Ministry (National Police). Illegal wood trade are further controlled through the forest control point located in Tandapi, in coordination between MAE and the UPMA. However, the effectiveness of control and regulation is still limited, due to -in part- gaps and contradictions in the legal framework and to the limited cooperation between different institutions.

120. The installation of new specialized equipment and the strengthening of the Tandapi control point allow the reduction of illegal wood and wildlife traffic. The project will work to achieve the automatization, control point strengthening and community participation to support conservation and sustainable forest and wildlife management through a combination of awareness-raising and community-level governance.

121. These actions will directly reduce pressures on forest from unsustainable and illegal cutting, thereby reducing the need for control and vigilance; they will also lead to increased willingness by community members to collaborate with institutions of central and regional governments mainly CELEC Hidrotoapi, UPMA and MAE provincial directions thereby reducing the need to invest in “vertical” control and vigilance.

122. The project will implement a verification system to validate the proper conservation of the designated areas and the river basin management every three months through satellite images of high resolution, which will be useful to monitor and avoid future deforestation.

123. As part of the preservation mechanisms (ACUS) strategy, financial strategy with time horizon of 20 years will be develped. This strategy must be in line to the investment fund (**Error! Reference source not found.**) proposed in output 5 of component 2. Part of the financial resources generated by the fund mechanism will be addresed to support forest conservation in the present outcome. The fund will also support the maintenance and operation of the control and vigilance infrastructure.

124. Regarding the number of co-executors, given that this is a component of conservation and forest management, the sectors selected are those with a higher geographical remoteness, low population density and high pressure for deforestation. The reference coverage used in this case was the so-called "Priority Zones” defined by best-known process developed for Socio Bosque and MAE: a) threat levels defined through the proximity to access roads; b) historical patterns of deforestation; c) climate threats to the biophysical components of the basin (droughts, floods); d) environmental services: biodiversity refuge, hydrological regulation, carbon storage; and e) poverty level. As result, 33 sectors were selected out of 61 existing in the project intervention area (see Table 16). In the selected areas, 5,620 inhabitants are living, it is estimated that a total of 840 people will benefit directly from the activities of this component.

	Direct Co-executors				
Component	**Men**	**Women**	**Total indirect co-executors**	**Elderly**	**Total direct co-executors**
Conserve vegetation cover	2987	2633	5620	515	840

Table 16: Potential co-executors in the project

125. The following table shows the activities for component 1.

Outcome	Output	Activities
1. At least 230,000 ha of native vegetation is conserved to reduce the impact of climate change on the hydrological cycle under integrated watershed management	1. 1,000 ha of native vegetation is conserved by sustainable forest management and conservation mechanisms.	1. Prepare technical and biological studies. 2. Prepare zoning file studies. 3. Prepare ACUS Management Plan for Bio-corridor Conservation (MPCB). 4. Prepare studies to the Financial and Operational Sustainability Strategy according with the investment fund. 5. Prepare studies for implementing and monitoring the Biocorredor Management Model. 6. Increases the number of Decentralized Autonomous Governments (GADs) with planning, regulatory and normative instruments for ACUS. These should include the joint identification (PA authorities and GADs) of key habitats, restrictions and monitoring programs, and agreements for their implementation; inclusion in land-use planning processes of specific standards and practices for protecting forest and integrated watershed management; and Municipal ordinances on conservation, land use practices and ACUS. 7. Strengthen incentive systems for set-asides on private and community lands based ACUS. 8. Monitoring and supporting the Municipal PAs covering 1,000ha, in buffer zones and corridors, which have been identified as critical for water hydrological cycle. 9. Promotion of habitat and connectivity-friendly production options and programs for reduction of human/wildlife conflicts in association with the Ministry of Agriculture. 10. Participating in livelihood /productive activities demonstrated to reduce pressures on forest with at least 50% of women participation. 11. Strengthening of the hydro meteorological monitoring system in the Toachi-Pilaton river basin that includes the maintenance of hydro meteorological stations.

	2. Improved management of existing protected forests and private conservation areas (ca. 230,000 ha)	12. Reduction in the use of forest for productive activities in the Upper and Middle Basin of the Toachi and Pilaton Rivers (Landscape Las Pampas and Palo Quemado), through technology implementation in the process of panela production, that includes planning, assessment and monitoring of the each step. 13. Equipment and furniture such as technology change (ovens change to promote efficiency in the production of panela); forest planning and productive alternatives. 14. Planning and zoning of the river basin with a participatory and inclusive approach. Promote dialogue, coordination and technical support at the local level and improvement of the protector forest. 15. Implementation of the Management Plan of the protective forest, including ravine and shore protection activities. 16. Increase the process of planning and zoning of farms in which at least 50% of women participate. 17. Equipment and furniture incidence in increasing of ratings of the Management Effectiveness Tracking Tool and the PGOA. 18. Increasing the capacities to control wildlife and forest traffic that includes: Equipment for environmental control mainly for forest and wildlife with UPMA´s support; to strengthen the Tandapi control point; to install a control point in the Pampas area, acquisition of equipment in coordination with the Police; implementation of a monitoring system, newsletter and decentralization of information.

Table 17: Key activities in the component one

Component 2: Adapt farming practices to new climate change conditions and enable their climate smart financing

Component	Outcome	Output	Amount USD
2. Adapt farming practices to new climate change conditions and enable their sustainable climate smart financing	2. Sustainable farming practices and livestock adjusted to local realities are being introduced and implemented with assistance of financing mechanisms for adaptation measures	3. 250 ha of pasture and 250 ha of crops apply sustainable farming practices	340,000
		4. At least 2 institutions have introduced specific solutions and credit assessments to support the disbursement of credits for adaptation, integrating environmental and climate risks in their operations.	80,000
	3. At least 1 long term financing mechanisms has been piloted or introduced	5. One investment fund to promote sustainable development is set up and operational	420,000

Table 17: Component 2 and budget.

126. Component 2 is intended to provide the basis to assure the sustainability of ecosystem conservation. It is relevant that communities are aware of the importance of ecosystems for their livelihood, the agricultural productive systems, and the

development of income generating activities through ecosystem conservation, particularly related to climate change.

127. This component will generate the conversion to crop management in an environmentally sustainable and climate-smart way over at least 500 ha. Although there are some isolated efforts to apply cultivation methods in a different way, either by applying live fences (such as "quiebrabarriga and yucaraton"), or the implementation of silvopastoral systems, these have not been widespread or considered interesting alternatives for conventional agriculture. Although many farmers in the project's areas of influence consider it appropriate and important to implement measures to adapt to climate change in their crop management activities, their intentions are not put into practice due to the lack of knowledge on their implementation and the fear of assuming a risk that would affect their income and overall spending and payment capacity. Those farmers who have implemented sustainable practices have done so, motivated by a personal attachment to the conservation of their environment, the ecosystems on which they depend, rather than economic motivations.

128. The importance of the economic viability of sustainable crop management and the implementation of adequate adaptation measures hence cannot be underestimated. Farmers need to be convinced that the implementation of such measures translates into concrete and tangible benefits, especially economically. If smallholder farmers are not informed that adaptation to climate change is possible, they are not likely to adopt new technologies or invest for their adaptation and productivity enhancement. Such limitation in awareness and capacity increases the reluctance of small landowners to embark on the path to increased climate resilience and adaptive capacity.

129. The selection of activities was made under the previously described triangulation scheme (Figure 11) that results from the interaction between the documentary information, the revision of the normative-economic framework and the validation of the actions with the co-executors in the field workshops.

130. For the selection of suitable adaptation measures to be promoted and implemented with target populations, the project will apply MAE’s Cost Benefit Analysis methodology; Cost Effectiveness Analysis and Multi-criteria Analysis for adaptation measures recently developed in cooperation with the German Development Cooperation (GIZ), as well as methodologies developed in the UN Environment’s MEbA project (see **Error! Reference source not found.**). Findings will be applied for prioritized adaptation measures suitable for the area and included in the respective awareness raising campaigns and monitoring and evaluation mechanisms for their verification over time. Complement to the documental review in the component, a cost-benefit analysis was carried out (**Error! Reference source not found.**; **Error! Reference source not found.**; **Error! Reference source not found.** and **Error! Reference source not found.**).

131. For example, the implementation of irrigation systems, either sprink or drip systmes, the construction of small water reservoirs or introduction of crop rotation and intercropping systems, are generally not identified by the farmers when discussing

possible sustainable and resilient agricultural practices. However, local communities consider the increase in productivity of crops and livestock per hectare. This fact motivates the combination of local adaptation knowledge and practices with international best practices and methodologies.

132. The component intends to capitalize on the communities' experience, combined with proven solutions to empower vulnerable communities with comprehensive adaptation practices. Instead of focusing on specific adaptation practices, the project will introduce methodologies that enable the different stakeholders to promote adaptation and sustainable agricultural and livestock practices on a permanent basis: adaptation to climate change will always be a process rather than a specific l activity.

133. Many farmers agree that ecosystems in the areas of the Río Blanco upper basin are being permanently threatened by logging, in part by the constant expansion of the agricultural frontier and livestock ranchers. They argue to ignore the adaptation alternatives, therefore if communities have convincing alternatives to sustainable manage their farms, there will be a gradual adoption of these farming methods.

134. The artisanal production of panela is intensive in the use of wood for the combustion of their boilers. As alternative, the project will promote a technological leap, integrating boilers that use alternative energy sources (such as bagasse) and increase overall energy efficiency, under the "Best Available Technology" (BAT) approach. The objetives of this intervention isto relieve the pressure on surrounding forests, harmonizing with other measures to protect the ecosystems and forests of the project's areas of influence. This technological upgrade will be considered as an integral part to change the paradigm of current artisanal production, complementing sustainable agriculture and livestock practices. These activities are directly related with forest preservation efforts of component 1.Finally, suggestions were collected and validated during the field workshops (**Error! Reference source not found.**). Stakeholders identified the activities for the component, which re summarized in the following diagram:

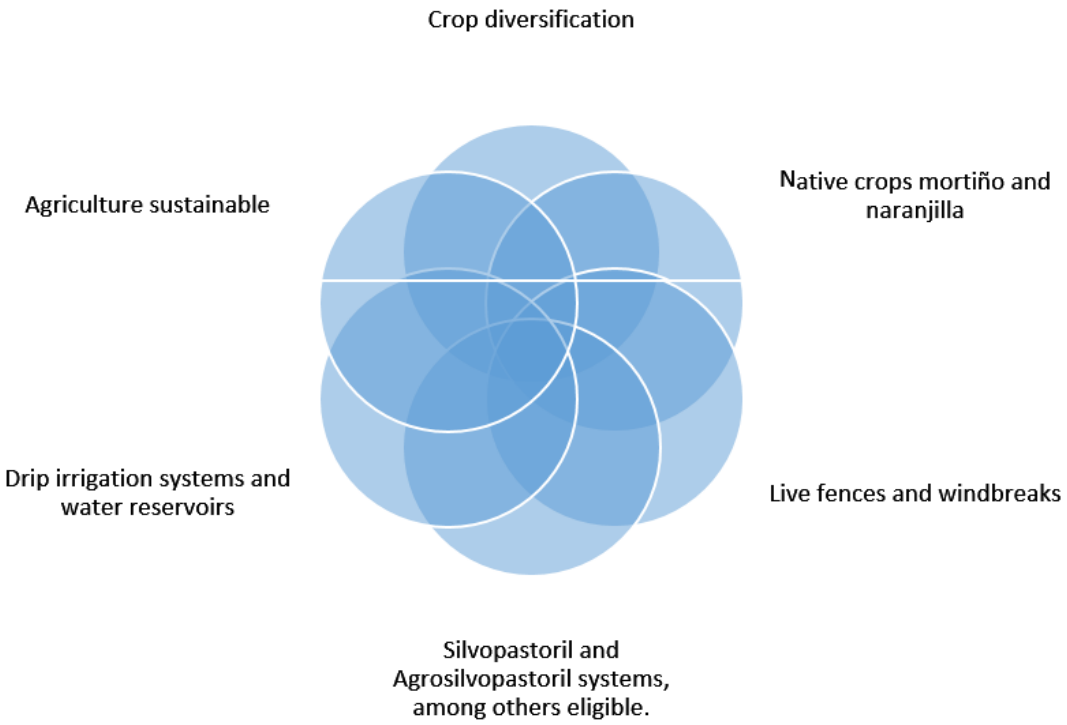


Figure 21. Main concept identified for the component 2

135. The adaptation measures correspond to local needs and meet the criteria of applicability, cost benefit and are in accordance with the regulatory framework of Ecuador:

- The improvement of family farms, which helps especially women as head of household, to enhance the daily diet of family members and even generate additional family income by selling surplus on local markets.
- Crop diversification, which not only helps to increase biodiversity but also promotes risk mitigation of family income, where applicable relying on native varieties.
- Local native varieties will be promoted such as mortiño (*Vaccinium floribundum)* and naranjilla (*Solanum quitoense*).
- Live fences and windbreaks
- Silvopastoril and agrosilvopastoril systems, among others eligible.
- Drip irrigation systems and water reservoirs

The following figure details a summary of the activities suggested by the local actors that are adapted to component two of the project:

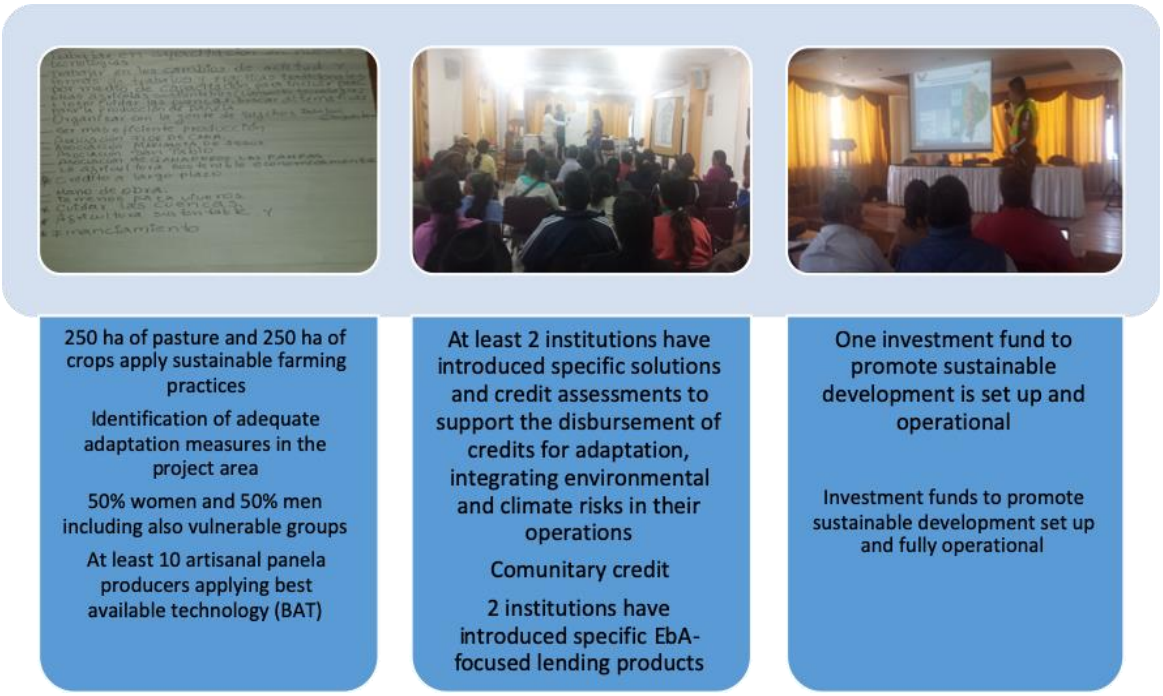


Figure 22. Main activities identified with the communities for the component 2

136. Hence, selection criteria for the identification of suitable adaptation measures for individual farmers need to be flexible and take into account each farmer's specific situation, such as:

- Access to important infrastructure such as roads
- Slope of the farms and grazing area
- Soil texture and quality
- Actual crops cultivated or livestock bred, including varieties and types
- Availability of critical inputs
- Pricing of inputs in each area

137. The combination of these critical productivity drivers will not only determine the productivity of farmers under business-as-usual scenarios in face of adverse climate impacts, but also define what actual adaptation measures promise not only the optimum results but also if their implementation is feasible at all.

138. The project will seek the cooperation with the UN Environment's Microfinance for Ecosystem-based Adaptation project, which has identified a set of 40 EbA measures specifically suitable for the implementation by smallholder farmers. The MEbA project has so far implemented almost 10,000 EbA measures (for a total financing of over USD 12 million, exclusively provided by the microfinance institutions' own funds and paid by the farmers) in cooperation with 5 microfinance institutions in Colombia and Peru and is assessing the implementation of its solutions in Ecuador. The MEbA project is funded by the German Federal Ministry of Environment via its International Climate Initiative.

139. The MEbA project has developed tools that support the individual assessment and prioritization of EbA measures to be applied with small farmers as part of operational processes of institutions interacting with small farmers as input or service (such as technical assistance or finance) providers.

140. The project will hence promote with the communities the application of proven interventions to:

- Improve agricultural productivity and socio-economic resilience,
- Conserve ecosystems and sustainably support agricultural production systems,
- Increase climate resilience of vulnerable populations and the ecosystems they depend on.

141. The approach of adaptation will be introduced with at least 250 local smallholder farmers, to reduce the pressure of farming and livestock activities on native forests and ecosystems.

142. Working with farmers´ organizations and other potential multipliers such as input and finance providers, best practices will be introduced to increase production using a reduced area of agricultural land. The main lines of work will be (i) cattle and pasture management, and (ii) sugarcane production. Nonetheless, other crops will also be addressed (e.g., mortiño, naranjilla,), also against the background of crop diversification as an ecosystem-based adaptation to climate change via the diversification of agricultural activities to mitigate resulting productive and economic risks. Agricultural intensification, i.e. the technologies to produce more (and of better quality) on less land, is importante to stop deforestation and resources over-exploitation.

143. The project will build upon existing infrastructure and processes of partner institutions to generate sustainable mechanisms targeting investments into adaptation measures. Local input providers and financial institutions will be engaged to improve their respective knowledge and awareness to engage them to participate in the activities of the project. Capacity building will be implemented to reinforce the stakeholders' understanding of the risks and opportunities to include adaptation solutions in their operations.

144. In addition, an investment fund will be established to support the respective finance of adaptation investments. This financial instrument offers a mean to involve different actors on a long-term basis.

<u>Outcome 2: Sustainable farming practices adjusted to local realities are being introduced and implemented with technical assistance of innovative financing mechanisms for adaptation measures.</u>

145. The geographical scope of the project is broad; the participation of different cantons and parishes is confirmed. The project area of operation comprises high Andean areas with paramo ecosystems and Andean cloud forests, down to zones with sub-tropical climate. In the same way, the topography in which the activities of agriculture

and livestock are being executed is varied, comprising farms located in sites with pronounced slopes as well as farms in places with reduced slope and close to the rivers.

146. Consequently, it is not possible to define an established set of sustainable agriculture and livestock adaptation measures ex-ante. Instead, adaptation and ecosystem conservation strategies will be designed during early stages of the project, considering the particularities of the different types of crops managed in the area (sugar cane, naranjilla, mortiño, among others), topographic and (micro) climate conditions, local climate change perceptions of vulnerable populations, agricultural practices implemented as well as existing experiences in the different parishes. Furthermore, the cultivation of native species (e.g. mortiño, naranjilla) in a sustainable way will fit within the biotrade (Biocomercio) initiatives that have been developed in the country and are of interest to the Ministry of Environment under the bioeconomy approach.

Definition of adequate adaptation measures

147. To facilitate the acceptance of the proposed adaptation strategies, it is suggested to identify existing experiences with adaptation practices in the Río Blanco upper watershed and surrounding areas. Initiatives focusing on climate resilience of small landholders will be identified and evaluated, targeting the identification of already adopted adaptation strategies in local areas.Lessons learned from other initiatives will be documented, systemized and integrated into the strategy formulation for their replication in the project. The objective is to increase acceptance in production changes by the farmers and their communities.

148. Insights drawn from such an exercise will help to develop quick wins for the participation of key stakeholder, i.e. defining products, which can be quickly introduced by replicating existing strategies already adopted. Furthermore, the selection methodology (**Error! Reference source not found.**) from the UN Environment's MEbA project will be applied for the customized prioritization of suitable EbA measures at an individual farmer's level with complement tools such cost benefits analysis and multicriteria matrix (**Error! Reference source not found.**; **Error! Reference source not found.**; **Error! Reference source not found.**; and **Error! Reference source not found.**).

149. Trial or partial introduction of innovative adaptation solutions allows the farmers to limit their investment on one hand, while enabling them to observe concrete benefits. In such a set-up, only a minor part of a farmer's plot is managed using the new practice, while the remainder is managed in a traditional way. During harvest, and of course over the development of the crop, the performance is being monitored and documented to yield levels. Such implementation approaches have been shown to increase acceptance especially in remote communities.

Financing of adequate adaptation measures

150. A major limitation for successful adaptation is the availability of financial resources for adaptation investments. Traditional financial service providers limit their

exposure to the most vulnerable populations and focus on traditional agricultural practices for those farmers eligible for financing.Hence, the project will also strengthen finantial services focused on smallholder farmers to support investments into adaptation as described below.

151. Where appropriate, technical assistance will be provided to improve farmers's access to financial services. Being more resilient, having implemented adaptation measures will enable these populations to receive credits. In consequence, it will enable beneficiaries to finance more important investments, with higher opportunities for increased economic return and climate resilience.

152. Communities in the target area have a certain access to credit. Nevertheless, credits do not target investments in adaptation practices, but to traditional practices, which regularly contribute to ecosystems degradation and climate vulnerability.

153. The volume of credits, the number of co-executors, and the degree of financial inclusion, vary among the geographical areas targeted by the project. For example, in Las Pampas, in December 2014, USD 3,239,340 were granted in 534 lending operations, resulting in an average loan of USD 6,000. In Mejía, in 2013, USD 30,470,353 were invested in microcredit, delivered mainly by banks (61.09%) followed by cooperatives (38.91%). In Palo Quemado, 44% of the population has access to credit.

154. The project will hence take into account the level and scope of financial inclusion among the various communities, with the aim to propose adapted solutions for each of them.The project will promote to mobilize the existing credit supply towards adaptation investments assuring economic return for farmers, conservation for ecosystems, reduction of climate vulnerability for the communities, and financial return for financial institutions. This strategy will therefore support a triple bottom line of economic, social, and environmental return for all involved stakeholders.

155. The project will take into consideration the lessons learned in two of the most innovative projects involving smallholder adaptation finance, that have been operated in LAC: the MEbA (see reference 1 of **Error! Reference source not found.**) and CAMBio (see reference 2 of **Error! Reference source not found.**) projects.

156. Strategies are proposed to allow a holistic approach to promote investments focused on climate change adaptation by providing technical and economic assistance (where needed) and financial resources directly to the farmers (via credits) as well as creating the conditions for the development of financial mechanisms that work in the project area in the long term.

157. Financial institutions assisting farmers and ranchers in the area do not yet have finantial products to facilitate, nor promote, a transition to sustainable agriculture and livestock management models. Capacity building through the intensive training at the operational and management levels, as well as the appropriate tools to facilitate the adoption of adaptation criteria into their credit risk assessment is crucial to generate the interest and expectations.

Output 3. 250 ha of pasture and 250 ha of crops apply sustainable farming practices

158. As previously explained, communities living in the selected areas are threatened by a multitude of challenges, including poverty, low agricultural productivity, lmited access to water, adverse climate impacts and environmental degradation. To foster community adaptation capacities, it is neccesary to define, develop and implement agricultural practices that can generate higher income, reduce climate vulnerability and conserve ecosystems.

159. Introducing adaptation practices in agriculture and livestock management is the approach to change from conventional farming towards resilient and sustainable agriculture. Ecosystem-based adaptation practices will be introduced on at least 250 local smallholder farms, to reduce the impacts of farming and livestock over native forests, ecosystems and land. Best practices will be introduced to increase production using a smaller area of agricultural land.

160. Following the methodology presented in **Error! Reference source not found.**, different adaptation practices have been identified. Suitable adaptations strategies will be identified according to local realities. For example:

- The establishment of family gardens, which helps especially women as head of household to enhance the daily diet of family members and even generate additional family income by selling the surplus on local markets.
- Crop diversification, which not only helps to increase biodiversity but also promotes risk mitigation of family income, where applicable relying on native varieties.
- Local native varieties will be promoted such as mortiño (*Vaccinium floribundum*) and naranjilla (*Solanum quitoense*).
- Live fences and live windbreaks.
- Silvopastoril and agrosilvopastoril systems, among others eligible.
- Drip irrigation systems and water reservoirs.

161. **Error! Reference source not found.** presents some measures that can be selected to be implemented within a comprehensive farm managed in a sustainable way. These EbA practices were drawn from the catalogue for EbA practices developed in the project ("MEbA Options, costs and benefits", UN Environment, 2013), and will be combined with ongoing initiatives in Ecuador such as the Ministry of Agriculture's Planification of Integrated Farm Management in the framework of the program Productive Transformation Agenda of the Amazonas.[28]

Implementation strategy

162. The activities, as presented in **Error! Reference source not found.**, only provide a framework and not a final solution. In particular, the possibility to include existing local agriculture practices into Ecosystem based Adaptation, will be assessed in detail during the inception phase of the project. These will promote local practices

[28] Farming Plans, reference ATPA Program avaible: http://www.agricultura.gob.ec/agenda-de-transformacion-productiva-amazonica-reconversion-agroproductiva-sostenible-en-la-amazonia-ecuatoriana/

that have already proven to be more resilient, and support the introduction of community based adaptation strategy into the overall strategy of the project.

163. As previously mentioned, a two-step strategy will be implemented to introduce adaptation measures with local communities. The underlying principal is to focus on gradually upgrading vulnerable populations that are currently not having access to market-based solutions for inputs, capacity building or finance via direct and subsidized support.

164. Under the first approach, the implementation of sustainable management solutions will focus on but not be limited to the most vulnerable populations, with specific target on women individually, or women associations where applicable. Specific vulnerability criteria for their proper selection will be defined in the early phase of the project. Such vulnerable population will be supported only for adaptation investments that can be reached with low investment and limited capacity building effort, but allowing for interesting economic return. The project will identify suitable adaptation measures to that end following the details presented in **Error! Reference source not found.**.

165. The finantial and technical assistance plan will be implemented to strengthen their financial literacy. The purpose is to train farmers on the basic aspects of debt management. Once the farm is reaching a state of greater resilience and hence becoming credit eligible, the respective farmers are empowered to make financial and investment decisions. For vulnerable groups, this step-by-step proposal will be the best chance to facilitate acces to finantial services.

166. The second approach is addressed to those farmers who already have access to micro loans. For these farmers, the project will facilitate the link with financial institutions that have been trained adaptation criteria. Such credit worthy population will take advantage of the possibility to establish more profitable EbA investments. At the same time, it is required more upfront capital, in this case provided by a tailored microcredit, and longer return time. Moreover, credit worthy farmers will also have the advantage to have access to more extensive training on EbA and more involvement in adaptive practices. The implementation of farming activities will be funded and monitored by the project.

167. Regarding the intervention of financial institutions providing micro lending approach, this include all credit operations addressed to small business from different sector: service, production, commercial and agriculture. The maximum consolidated debt is not larger than USD 50,000 and annual sells not over USD 100.000. Personal guaranties are the most common collateral.

168. For a better understanding of the current situation, a short survey with the participants in the socialization workshops was done, where 46% of the attendees have credit acces with a broad range of amounts going from USD 1,500 to USD 15,000. This means that financial institutions are reaching the project area and disbursing credits.

169. Assuming common agricultural areas of 2 hectares per crop, and an investment in adaptation practices of around 50% of the farm, the project will reach 250 farmers

to reach 250 ha. For livestock an average of 20 hectares is estimated, considering that only small part of the farm will be invested at first for EbA activities, this allows the participation of 125 farmers, considering that only 10% of the farm will be assigned EbA practices. This activity considers the involvement of at leat 50% of women for both agriculture and livestock. Finally, is worth to take into consideration that farms larger than two hectares will not be automatically rejected. A case-by-case analysis will be applied.

170. The direct co-executors of the intervention are estimated to be between 250 and 375 according to acceptance rate and farm size. Considering the average family size [29] (4.7 members per family), it is estimated that the project will reach between 1,175 and 1,763 indirect co-executors.

171. The two-step strategy presented above, consist on using distinctive criteria to involve the most vulnerable people and the credit worthy beneficiaries. This strategy aims to include the most vulnerable but also to support the less vulnerable farmers with adapted interventions allowing them to capitalize their experience. This strategy will assure social inclusion and financial sustainability at long term. Figure 23 provides a schematic presentation of the intended implementation approach:

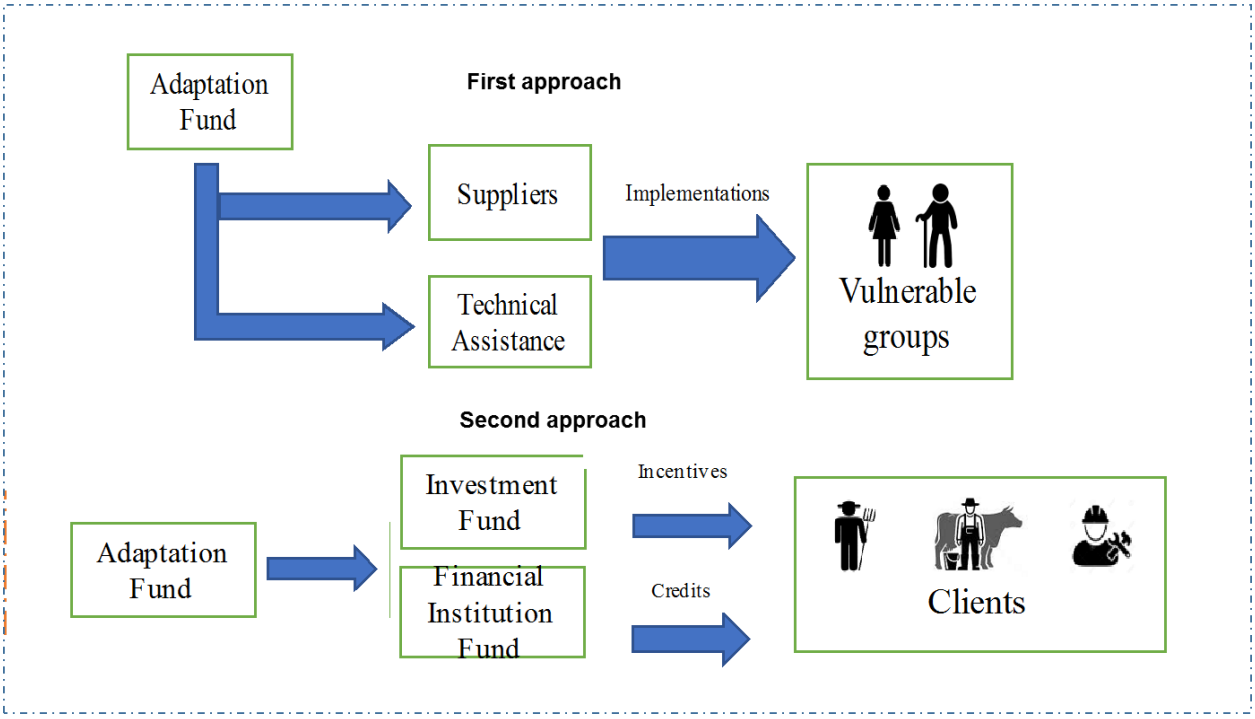


Figure 23: implementation approach

172. Details on activities to be carried out with financial institutions to support the second approach will be detailed in the next section.

[29] Men and women in stadistics III, INEC and ONU Waomen. 2010

Output 4. At least 2 institutions have introduced specific solutions and risk assessment methodology to support the disbursement of credits for adaptation, integrate sustainable and climate smart criteria in their operations.

173. The participation of the financial institutions, which have infrastructure and client portfolio in the area, can be catalytic to promote a gradual transition towards sustainable agriculture models.

174. The introduction of such lending products, draw from lessons learned in projects such as CAMBio or MEbA, regularly requires broad internal awareness raising, training campaigns, and support in strengthening lending processes. Nevertheless, it holds the promise to find strong partners that are serving the last mile in rural areas, and channel critical financial resources targeting adaptation directly to end co-executors. Furthermore, these institutions usually collect data on the socio-economic and productive reality from these clients and can hence be key partners in increasing the understanding of the most vulnerable populations.

175. This project will support financial institution through training and tools development. In particular the project aim to train financial institutions in the region to understand, recognize, manage and offset -when possible- the climate and environmental risks of their portfolio. Specific climate smart lending methodologieswill be developed to allow the inclusion of climate and environmental risk in credit assessment and disbursement. Risk management tools at client and portfolio level will be developed. Such innovative solutions will allow the financial institutions to increase their institutional knowledge on potential clients, and develop the correct price-risk policy for the promoted EbA activities To financial institutions, it will be explained how to identify climatic and environmental risks within their portfolio, how these risks can manifest as credit risks, and what are effective coping strategies. The aim is to align better financial performance, with ecosystem conservation and reduction of climatic vulnerability.

176. The development of investment catalogues that include EbA measures would be an additional incentive for the financial institutions. The intervention will include the selection of measures to be financed; the incorporation of software that facilitates the process of evaluation, qualification and monitoring, reporting processes;, the training of staff and clients as the potential benefits for institutions that are encouraged to participate in the project.

177. The strategy to encourage investments to consolidate more sustainable agriculture and livestock and to boost technological leaps that reduce the pressure on forests (panela producers) will go in two directions: one focused on the financial institutions to promote the disbursements of credits, and the other one, towards the client to strengthen credit access. For the latter case, mechanisms will be structured to provide economic incentives through concessional credits including differential characteristics in the term and guarantees. After the project’s end, economic incentives will be provided to the clients in the following way:

- Farmers can invest into EbA via specific credit lines. By investing into productivity enhancing EbA options, accompanied with a proper communication strategy (see output 8), sceptical actors will be guided to understand the investment logic via adjusted financing.
- Financing institutions will be incentivized and will enable to introduce risk-adjusted pricing, which will favour better-adapted smallholder farmers. Further decreasing interest rates and hence providing economic incentives.
- Financial institutions expand their range of financial products for adaptation and mitigation of climate change.

178. From the financial institution point of view, the positive aspects to implement specific finantial products for adaptation will be:

    1. The verification and documentation on the use of funds is vital to generate trust of interested investors as well as to satisfy their “Know Your Client (KYC)” requirements. There exists an increasing desire in international financial markets for triple-bottom line investments, i.e. providing financial, social and environmental returns that can be strongly addressed via the financing of adaptation activities, if these are documented.

    2. Reducing overall operational costs and risk, and improving co-executors’ knowledge, will result in an overall gain for the participating institutions and communities. The project will identify and engage a software solution provider capable of providing solutions that are especially designed to reduce cost and capitalize institutional understanding and strategies on monitoring.

179. To assure the financial sustainability of the project financial institutions will be included and incentivized to provide financial support to smallholders.

180. During the project, two financial institutions will be involved: one public and the other private. The present project does not aim *per se* to provide the credit lines to the financial institutions, while it will work with the financial institutions to channel part of their existing funds, or to have access to international funds such as GCF, towards smallholders. The incentive of the present project would be:

    1. Provision of climate risk management methodologies and tools to the financial institutions. With this, finantial institution will be able to reduce their risk in agriculture lending and reduce their operational cost to assess and monitor agriculture credits

    2. Provision of tailored technical assistance to financial institutions in environmental and climate risk aspects, and the implementation of specialized credits for smallholders, based on best and proved international standards for green lending.

181. Currently, few financial institutions include aspects of sustainability in their operations. Ten private banks in Ecuador adhered to the Sustainable Finance Protocol promoted by the Association of Banks (ASOBANCA), however, in the sector of cooperatives, there is still no such initiative.

182. The proposal at the national level for the management of financial sustainability approach rests on three specific aspects:

1. Internal environmental management: measurement of the consumption of resources inside the financial institutions to elaborate baseline, establish actions of mitigation and compensation. It involves the training of all the staff of the institution and the creation of internal mechanisms to identify the main direct and indirect environmental impacts and the way in which they must be managed. The launching of internal committees and environmental management policies are part of this process.
2. Environmental and Social Risks Assessment (ESRA): It consists on the implementation of mechanisms to (i) identify environmental risk in the economic activities that are financed, (ii) manage them by requesting additional requirements or (iii) rejecting the loan if proper corrective measures are not taken to mitigate the environmental impact. This mechanism and its evaluation processes will be harmonized, as far as possible, with financial institution's credit methodology, and will be incorporated into screening process and decision-making activities (credit committee).
3. Green lending: this is a new element in the financial mechanisms of the country and very few financial institutions have specific tools to address issues of environmental protection, energy efficiency and renewable energy. The main obstacle is the lack of awareness of the opportunities in this market.

183. In addition, another effort in the same direction has been developed in the country, the Environmental and Social Management Programme for Financial Institutions ("Programa de Gestión Ambiental y Social para Instituciones Financieras" - PGASIF). This initiative headed by the CAF since 2012 is oriented to share lessons and provide technical assistance to improve the environmental aspects inside the whole financial operations. Important steps have been taken in Ecuador with the PGASIF support, such as the Financial Sustainability Protocol, an initiative promoted and implemented by CAF together with with the National Banking Association ASOBANCA. So far, 10 leading banks have ratified the protocol.

The financial institutions' environment

184. In Ecuador 696 cooperatives and 26 commercial banks are active. With about 22% market coverage, Ecuador is far above international benchmarks in financing smallholder farmers. The cooperatives are divided into segments, and distributed accordingly, as follows:

Segment	Total assets (USD)	#
1	Greater than 80,000,000	26
2	From 20,000,000 to 80,000,000	33
3	From 5,000,000 to 20,000,000	84
4	From 1,000,000 to 5,000,000	183
5	Up to 1,000,000	370
	Savings bank and associations, communal banks	unknown

Table 1918: Cooperatives in Ecuador

185. The project has identified the following institutions as being active in or around the Río Blanco upper watershed. Potential partners in that activity already identified could be:

    1. Cooperativa CACPECO: Segment 1 cooperative
    2. Cooperativa Manantial de Oro: Segment 3 cooperative
    3. Cooperativa Maquita Cushunchig Ltda.: Segment 2 cooperative
    4. Cooperativa San Miguel de Sigchos: Segment 4 cooperative
    5. Cooperativa Unidad y Progreso: Segment 3 cooperative
    6. BanEcuador: state-owned rural development bank
    7. Banco Pichincha: market-leading commercial bank with a microfinance subsidiary (“Credife”)

186. In Manuel Cornejo Astorga there also are present:

    1. Banco Solidario, specialised in microlending
    2. Cooprogreso, segment 1 cooperative

187. Further institutions identified are:

    1. Las Pampas livestock ranchers´ association to introduce improved livestock and pasture management practices in 250 ha.
    2. Flor de Caña Association (sugarcane producers) to introduce improved practices for sugarcane production in 250 ha and to explore forms to improve panela production units to reduce the use of firewood.
    3. The association of producers from Quinticusig who grow and process mortiño (Vaccinium meridionale Swartz).
    4. The Women association Marianita de Jesús en Las Pampas composed by 18 women

188. The project will foster data-smart process management (provision and financing) to create a multi-stakeholder support ecosystem that will be attractive to financing from market players. Details on respective activities are being presented below.

189. Direct co-executors of the respective activities will be two financial institutions with established presence of operations in the area.

Mechanism for lending approach:

Beneficiaries	Type	Units (hectares / producers)	Investment (per hectares or units). Average	Mechanism			Technical Asistance (15% o 10%)	Charge to Adaptation Fund
				Credit	Grant (70%)	Bonus 15% farmers + 5% MFI		
100	Crops	100 ha	**$ 1.000,00**	$ 100.000,00	0	$ 20.000,00	$ 15.000,00	$ 35.000,00
150 (vulnerable groups)	Crops	150 ha	$ 1.000,00		$ 105.000 +($ 45.000 farmers contribution)		$ 22.500,00	$ 127.500,00
125	Livestock	250 ha	$ 500,00	$ 125.000,00	0	$ 25.000,00	$ 18.750,00	$ 43.750,00
10	Panela porducers	10 units	$ 10.000,00	$ 100.000,00	0	$ 20.000,00	$ 10.000,00	$ 30.000,00
				$ 325.000,00	**$ 105.000,00**	**$ 65.000,00**	**$ 66.250,00**	**$ 236.250,00**

Resources from output 3	$ 105.000,00
Resources from output 3	$ 66.250,00
Resources from output 4	$ 65.000,00
	$ 236.250,00

Table 20: Mechanism for lending approach

190. In order to achieve the goal of 500 hectares managed sustainably for agriculture and livestock and including the production of panela, we have the expected number of hectares (in the case of agriculture / livestock) and units (in the case of manufacturers). The average investment for sustainability measures per hectare is estimated at around USD 1,000 per crop and USD 500 for livestock ranchers. It is assumed, that only 10% of the cattle ranch area will be dedicated to new measures; and that USD 10,000 of average amount of investment for the artisanal manufacture of panela will be necessary. For farmers with access to credit, a 20% incentive is proposed, 15% over the capital borrowed and 5% for the capital lent by financial institution. For the case of sustainable crops of vulnerable groups (including entrepreneurs of this group) the grant mechanism is used in a much focused way, the investment in sustainable measures will be addressed 70% assumed by the grant as incentive and the remaining 30% as beneficiary contribution (workforce).

191. In the case of livestock and the manufacture of panela is expected granting donations because the nature of their business shows that the entrepreneurship itself would be costly without applying even sustainable measures. On average, the cattle ranch requires 20 hectares, which leaves little room for entrepreneurs. Therefore in this case, itwill be applied a similar 15% performance bonus (105 livestock rancher and 5% MFI) on the principal of the credit as a unique mean of incentive.

192. The case of the panela producers is similar, usually these businesses are already establishedwith a certain trajectory. For them, investments of USD 10,000 are estimated, to finance the most efficient furnaces (which use another source of fuel like bagasse) and, if the investment plan is fulfill, a 20% bonus is applied with similar structure mentioned above.

193. In all cases technical assistance is estimated and added to the resources needed, however, this aspect is part of output 3.. The resources forf credit implementation under the figure of bonus is part of the budget of output 5 realized by the establishment of an investment fund.

194. The figures estimated are conservative and leave a room for the inclusion of more participants, as the intention is to reach at least 500 hectares with sustainable management but if possible, even more areas could be introduced.

195. The methodology to manage climate lending risk and to develop financial instruments like green lending is expected to be introduced in the two financial institutions. This isnot intended to be used in only the scope of the current adaptation project, but in all operations at national level.

196. Two institutions will be supported via specific consultancy as well as training measures. Where possible, the project will seek the coordination and the cooperation with the UN Environment project microfinance for Ecosystem-based Adaptation to climate change (MEbA) and participate in workshops and knowledge sharing lessons organized by CAF's PPGASIF project and other similar initiatives. UN Environment's office in Panama is currently assessing to replicate the MEbA project in Ecuador, where several institutions have expressed their interest in the project (see **Error! Reference source not found.** for more details on these solutions).

Implementation with financial institutions

197. The following details as well as the implementation plan for these activities over time is presented below. The implementation of climate-smart lending and EbA financing product development will be organized in different which are summarized with different activities in the work plan.

- **Phase 1 - Initial screening**
  The initial screening serves as starting point and targets the review of a partner institution's existing data available, experience in green inclusive finance as well as existing lending products and processes. Based on these findings, a project framework or strategy is defined and a detailed work plan elaborated.

- **Phase 2 - Framework definition**
  During phase 2 the general framework is developed, with a specific focus on the identification and engagement of strategic partners such as training or input providers, if applicable. Term sheets to guide future cooperation agreements are elaborated with partner institutions, discussed, and negotiated with identified prospect strategic partners. Once the partnership set-up is agreed upon with one or several partners, respective cooperation agreements are drafted and finally signed.

- **Phase 3a - Implementation of awareness and capacity development**
  During this phase, suitable EbA options are identified according to available information and experience in the local markets and based on the EbA options and methodologies presented in **Error! Reference source not found.**, among others. The selection of suitable EbA options follows the Cost-Benefit Analysis in detail and prioritization methodology presented in that same **Error! Reference source not found.**; **Error! Reference source not found.**; **Error! Reference source not found.** and **Error! Reference source not found.**. Other criteria to be considered are previous experiences with EbA activities in the area of the proposed project, the Rio Blanco upper watershed.
  Based on the defined options, training materials will be developed as well as internal employees and external agents trained in the overall set-up and the promotion and capacity building offers of specific EbA options.

- **Phase 3b - Implementation of lending support**
  Lending support will be promoted via specific lending software. The supporting, cooperation or consulting firm to be selected will ensure the versatility of such lending software to incorporate future developments in best practices in lending and EbA. The software solution will work on mobile devices in order to allow for on-site data gathering in a structured way.
  Resulting crowd-sourced insights, i.e. insights gained by a multitude of co-executors (farmers) based on data gathered via different channels, will feed into the

- **Phase 3c - Implementation of financial products**
  Once the initial EbA options to be promoted are defined, the product design is to be developed. It is assumed that MEbA products (i.e. the financial product financing EbA options) will follow the same rules than “traditional” generic agricultural lending products, focusing on either input finance or asset investments. Hence most focus around the product design will be on the development of marketing materials and adjusted manuals and procedures.

- **Phase 4 - Pilot review and adjustments**
  Based on a predefined pilot protocol, including key performance indicators to monitor targeted outcomes such as handling and processing times as well as data quality, the pilot is started in dedicated pilot branches. Pilot assessments will be monitored and observation documented to enable ex-post assessment and adjustments if needed.

- **Phase 5 - Roll-out**
  Once the pilot has been concluded, all the necessary adjustments are introducesinto the standard documentation as well as the lending support software.

- **Phase 6 - Final evaluation and closing phase**
  After project activities have finalized, a final evaluation of the project will be performed. Results will be shared with UNEP ROLAC and potential donors providing financing.
  The project activities to introduce climate-smart lending and EbA oriented financial products will take 12 months with each institution as presented in the below workplan.

- **Workplan**

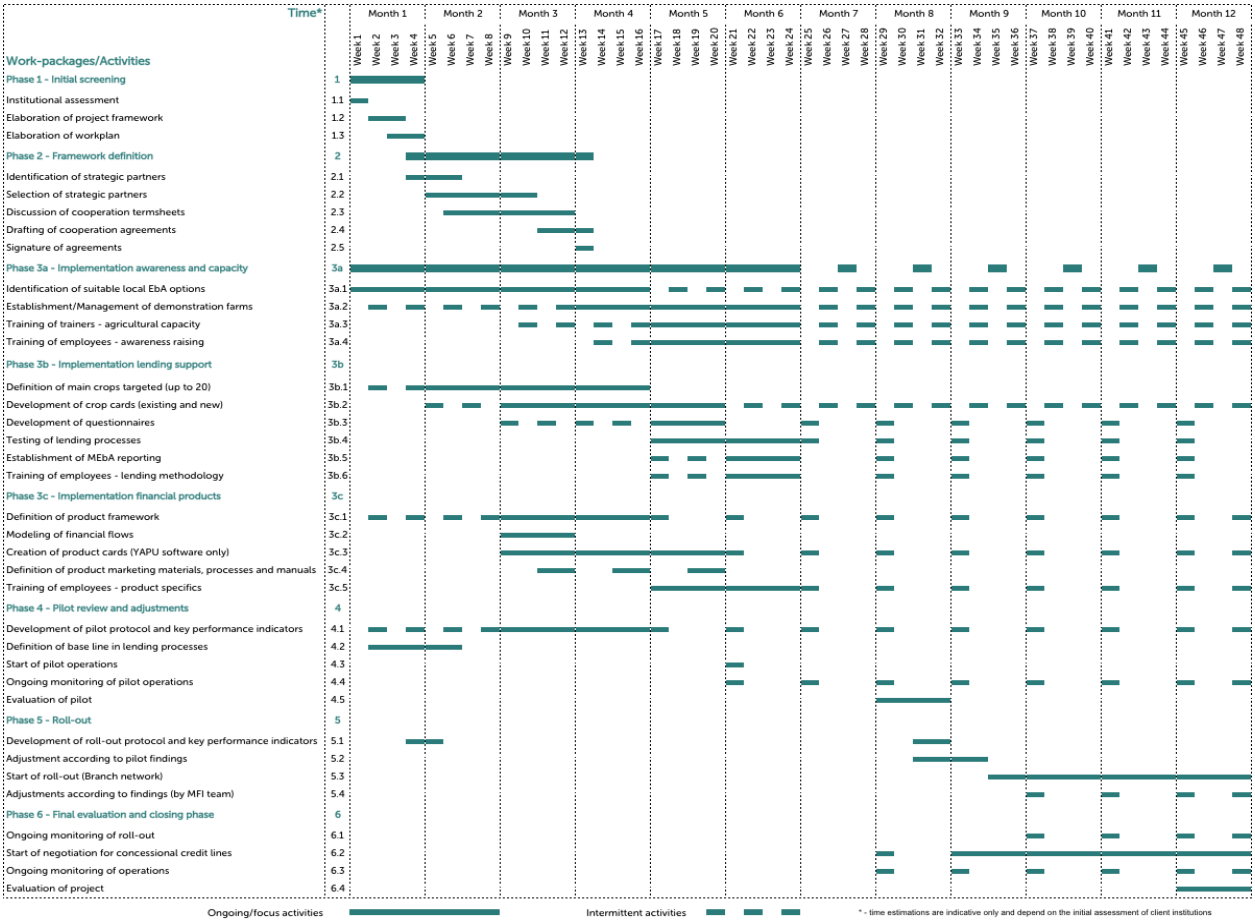


Figure 24: Workplan

Outcome 3. At least 1 long term financing mechanisms has been piloted or introduced

198. A sustainable development fund will be a useful mechanism to integrate contributions from public and private stakeholders in the long-term . Ecuador has a strong experience developing and using similar schemes such as water funds and is hence in a good position to introduce such mechanism. For instance, a leading experience is the “Fondo de agua para la conservación de la cuenca del río Paute (FONAPA)”. This fund is related to the Paute hydroelectric power station. The constituents include Cuenca´s water company (ETAPA), HIDROPAUTE (a state-owned hydroelectric company), ELECAUSTRO (the electric company that provides service to Cuenca and surrounding areas) and the national company in charge of providing electricity along the country (CELEC).

199. In addition, CORPEI CAPITAL is an investment fund that only operates to assist the financial needs of micro, small, and medium enterprises. An interesting set of financial tools are used to this end, such as: factoring, grants, investment in equity and conventional lending

200. The fund for sustainable development (FODES) of the Río Blanco upper watershed will operate under the securities market law, since it will work through the constitution of a trust, and will be a long-term financial scheme. The resources contributed by the project will be seed capital so that more adherents join the fund. The interaction between FODES and financial institutions operating in the area will be desirable and complementary in order to underpin the financing of initiatives aimed at improving the resilience of agricultural and livestock farms and to promote dual mitigation / adaptation projects.

201. It is worth emphasizing, in line with the consolidation of FODES, and in accordance with output 4, the financial institutions will build their integral environmental management systems, strengthening their institutional capacities, and becoming the ideal partners in the fund for the channeling of resources through the offer of adaptation and mitigation credit lines. In this way, resources are used efficiently, since the financial institutions operating in this place already have the necessary infrastructure (premises, staff and methodology) for the successful placement of this type of green loans.

202. Another important fact to take into consideration is that several GADs have stated in their development planning, the importance of promoting financing tools according to the needs of the inhabitants of the area, so it is very likely to have their involvement, commitment and support.

Output 5. One investment fund to promote sustainable development is set up and operational

203. The creation of an investment fund to promote the sustainable development of the area of influence of the Río Blanco upper basin will use the best-known structure in the national context, such as water funds. The intention is that, using seed money from USD 420,000 coming from the project, the first year the funds will be used to set up the fund with the initial contribution of two people (a specialist and an assistant), with the infrastructure and basic equipment to do their job. USD 80.000 will be kept in liquid financial instruments to be use for the lending incentive mentioned before. The remaining USD 327,600 will be used as assets for investments that will strengthen its capital over time.

204. This initial capital USD 420,000 will be invested in financial instruments available in the market with an interest rate of not less than 7.76%. It is worth mentioning that the “Fondo de Manejo de Páramos y Lucha contra la Pobreza (FMPLPT)” is currently invested in 20-year State Bonds with an interest rate of 8.45% per annum. The financial instruments, in which the equity is going to be invested, the interest rate, the term and the frequency of payment of interest will be the main responsibility of the director who will act under the strict supervision and authorization of the Board of Directors of the sustainable development investment fund.

205. In addition, the is possibility of work with financial institutions operating in the area for investments in certificates of deposit or other financial investment mechanisms. Although the interest of these investments is important to the fund, an important

component of such investments will be the counterpart's commitment to direct resources to the same extent towards adaptation credits in the agricultural sector.

206. This mechanism has already been used in the country. For example, in 2013 CORPEI CAPITAL (a known investment fund) made a long term deposit in a private bank in the country for around of USD 500,000, under the condition to address these resources exclusively to the promotion of Bio-trade (Biocomercio) through microloans

207. Even though there are many similitudes between water funds and this proposed mechanism, the scope and boundaries of the investment fund is broader than conventional water funds. So that, the range of potential investments to allocate the equity will include those that, even if they are not so profitable than other options, have a significant impact in the protection of the ecosystems and the rivers basin.

208. An important aspect to consider before implementation is that the contributions of constituents or adherents to the fund will be as important as the returns on their investments. The involvement of provincial, municipal and parochial governments through the regular allocation of resources is a task of political commitment. If there is no certainty that the contributions will materialize, the profitability of the fund will not be able to support investments generating a gradual weakening. As equity strengthens, its economic sustainability will be more assured as will its investments in projects related to ecosystem and community-based adaptation.

209. The resources for the economic incentives addressed to the farmers who have acceded to credit, will be handled through the fund of sustainable development. These resources are not a contribution to capital and will be transferred to the co-executors in the time that the project is being impleneted with farmers. In a conservative scenario, the fund will be capable to address USD 30,000 for protection projects since the begging of the third year increasing to USD 35,000 for the fourth year and so on. In the case of that interest rates obtained are higher than expected in the current feasibility analysis, the incentives will be adjusted accordingly.

210. A diagram is presented in the following Figure 25 to illustrate the financial dynamics and flows of the investment fund:

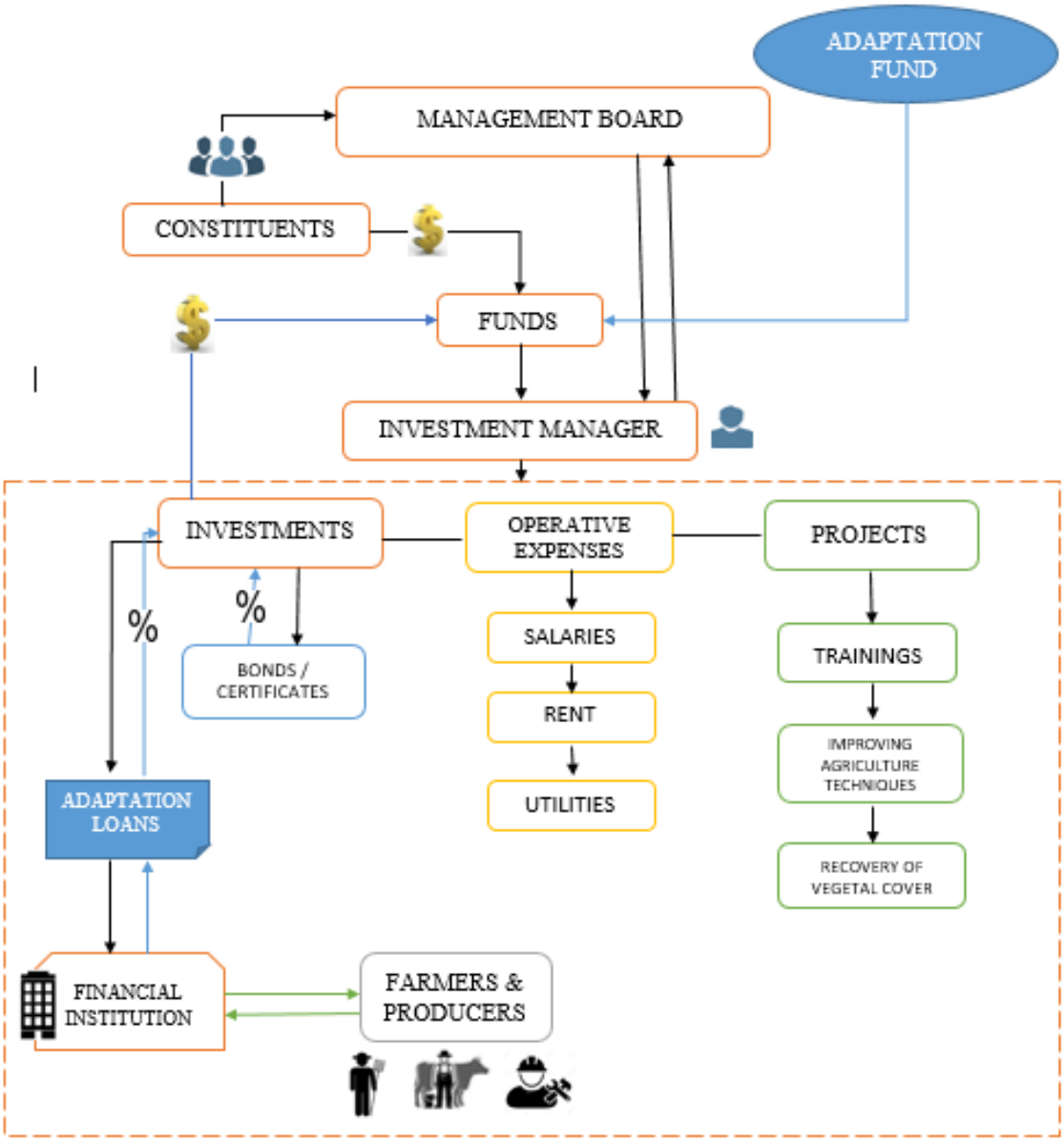


Figure 25: Financial dynamics and flows of the investment fund

211. In **Error! Reference source not found.** a deeper analysis is shown and an analysis of the feasibility of the fund is indicated.

212. The following table shows the activities for intervention under the component 2.

Outcome	Output	Activities
2: Sustainable farming practices adjusted to local realities are being introduced and implemented with technical assistance of innovative financing mechanisms for adaptation measures.	3. 250 ha of pasture and 250 ha of crops apply sustainable farming practices	19. Selection of experts in sustainable agricultural management and climate-smart livestock; Incorporation of an industrial technician with technical background to identify options of improvement in the technology for the panela producers. 20. Field visits by specialists to collect information such as types of crops, microclimate, vulnerabilities and resilience. Prepare documentation related to: definition of appropriate adaptation measures for farming and production areas, monitoring visits and documentation of the progress of adaptation measures. Identification of problems, grants for implementation. 21. Selection: Identify, through the defined procedures and actors, the participants for the construction of sustainable farms. The project management board reviews the profiles of participants entering into vulnerable groups for approval; Subsidy for 150 beneficiaries of vulnerable groups receive 75% of the cost and implementation of adaptation measures as grant, 25% will be counted as counterpart (labor) by the beneficiaries; Delivery of the implementation values to qualified suppliers by bank transferor certified checks. 22. Suppliers' identification process: announcement for all suppliers interested in participating in in the construction of sustainable farms. Interesting stock, good experience and reputation is a plus; the team should visit each suppliers to verify the provided information and the offered prices.
	4. At least 2 institutions have introduced specific solutions, risk assessment methodology to support the disbursement of credits for adaptation, integrate sustainable, and climate smart criteria in their whole operations.	23. Selection of consultants to work on the development of output 2 and 3. Knowledge and good experience in the field of software-based green lending or climate financing will be required; identification of adequate EbA and other adaptation measures for target customers of participating financial institutions; 24. ICT solution to collect automatically and systematically data in the field, software to facilitate the identification, qualification, monitoring and reporting of adaptation credits. 25. Development of climate smart lending management for different crops, to be implemented in lending processes of financial institutions; development of policies and procedures of climate risk management in the institution; development of financial products, product design including loan terms.
3. At least 1 long term financing mechanisms has been piloted or introduced	5. One investment fund to promote sustainable development	26. Economic incentives for eligible lending customers that will invest into EbA and other adaptation options, including the constitution of the trust and its full implementation.

	is set up and operational.	

Table 21: Key activities component 2

Component 3: Strengthen local capacities and share lessons

Project Components	Expected Outcomes	Expected Outputs	Amount USD
3. Strengthen local capacities and share lessons	4. Local population and parish governments with increased capacity to implement climate change adaptation measures.	6. At least 6 parishes being built capacities and prepared to manage and use meteorological information.	160,000
		7. Six development plans of local parishes incorporate measures for ecosystem-based adaptation to climate change.	80,000
		8. Strategic plan of communication, education, knowledge transference and scheme of replica, including demonstration farms and markets. Plus training on adaptation finance to financial institutions.	120,000
		9. Systematisation of information gathered during the whole project design and implementation using existing informatics platforms	40,000

Table 192: Component 3 budget per output

213. Component 3 presents the proposal to strengthen the local capacities of the six rural parishes and share lessons learnt during the implementation of the project. An action plan a set of core activities were defined to achieve the expected results during project execution, which are also sustainable in the long term. The main objective of component 3 is to increase the local capacity to implement adaptation measures and enhance the project's impact thanks to capacity and knowledge transfer to the community. By institutionalizing climate change adaptation within six parishes, the project aims to scale up of adoption of practices and procedures for climate change adaptation. Component 3 has a particular focus on women empowerment considering that women are, on average, more vulnerable to climate change. By targeting women we assure higher adaptive capacity of the community and more sustainable reduction of community's vulnerability.

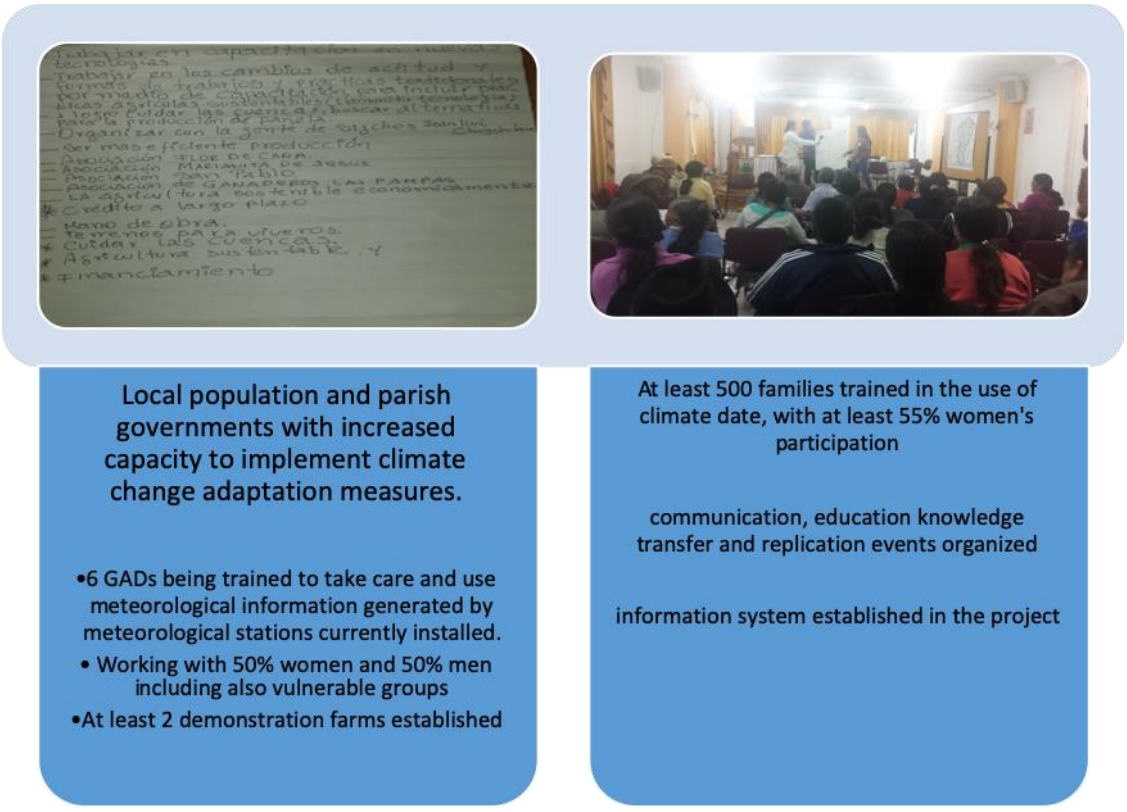


Figure 26. Key activities for the component 3 identified with the local communities

214. The two main tools used in Component 3 are: training provision and awareness raising. These will be addressed to the local actors, including but not limited to: public institutions, communities' representatives, vulnerable groups (with special attention on women), local micro and small enterprises, financial institutions.

215. The action plan includes training local actors in key topics, including: ecosystem conservation, water sources management, sustainable agriculture and livestock, access to funding, climate smart rural and agriculture practices, organizational development of associations and vulnerable groups located in the project area. Training will be provided and awareness raising will be provided through public events, workshops, one to one discussions, media communications, demonstration farms, communicational products and dedicated internet platforms.

216. The training will focus on disseminating and implementing measures to adapt to climate change so that the population has appropriate living conditions under the concept of resilience. The trainings will focus on identification of treats, definition of better coping mechanisms, and implementation of climate change adaptation initiatives. Communities will learn how to use meteorological information and implement climate smart agriculture practices. Component 3 promotes the use of new technologies to involve local actors in the implementation of measures in an effective and sustainable manner highlighting the importance of association and community organization to improve emporement and future sustainability.

217. The training will also be adressed to parish GADs, who have the responsibility to ensure compliance with article 14 of the Constitution, which guarantees the right of the population to live in a healthy, environmentally balanced environment that guarantees sustainability and Good living, Sumak Kawsay. Training will be provided also to financial institutions on climate vulnerability and environmental impacts.

218. Environmental and climatic criteria will be introduced into financial institutions' processes and procedures, training them to recognize environmental and climatic risks and support the financing of agriculture investments that are more profitable, but that also better preserve ecosystems and reduce climatic vulnerability for clients and financial institutions.

219. Demonstration farms will be implemented as well. Demonstration farms will show to community's members how to implement an efficient and climate smart farm, and what are the related advantages in term of yields, vulnerability, ecosystems. Demonstration farms will play both the role of awareness raising, but also of technologu transfer. Hence, farmers will be able to participate in trainings at the demonstration sites and compare the results with their farms

220. In addition, parish GADs will be able to include data and information related to climate change adaptation measures, with emphasis on gender and vulnerable groups, within their development and spatial planning plans. These documents currently have relevant information to articulate and coordinate priority local development actions, so it is possible to include climate change criteria, as established in the current ministerial agreement number 147. The agreement is based on the following general guidelines to include climate change imn local planning:

    1. General Data on the Autonomous Government Decentralized GAD and the Plan of Development and Territorial Ordering (PDOT).
    2. Identify climate threats and sources of information.
    3. Identify the trends of the sectors related to emissions in the GAD territory.
    4. Summarize the findings on the vulnerability of the PDOT programs and projects.
    5. Summarize the findings on mitigation opportunities in the PDOT programs and projects.
    6. Suggest modifications to the PDOT's vision and development objective.
    7. Define a prioritized list of mitigation and adaptation measures.
    8. Draw up fact sheets of the measures.

221. Strengthening local capacities allows the population and parish GADs to share the lessons learned through on-site visits, use of technology tools, and exchange workshops in each parish. Efficient mechanisms to share lessons learned will be key to assure multiplier effects, and foster the learning processes within the community. This is of fundamental importance to reduce the opportunity-cost of community members that would like to apply climate adaptation practices. This will finally allow to scaling up the effectively implemented pratices. For the implementation of component 3, 4 outputs have been established, in order to comply with the priorities defined in the logical framework of this project and its budget.

Outcome 4: Local population and parish governments with increased capacity to implement climate change adaptation measures.

222. The present outcome is based on four outputs described below. The outcome 4 has the objective to transfer capacity for climate change adaptation both directly to local population, but also to parishes' institutions, and hence supporting the establishment of an enabling environment for climate change adaptation for community members.

Output 6: at least 6 parishes being trained to take care and use meteorological information generated by meteorological stations currently installed.

223. The main function of meteorological stations is to provide climatological information to the parishes located in the project area. These stations provide information on temperature, precipitation, relative humidity and wind speed, to establish climate scenarios and improve decision-making. This information is useful for socio-economic activities carried out by the population located in the Río Blanco upper basin, including agriculture and livestock, and improving the quality of life of the population. This approach match very closely with output 2. The understanding and inclusion of climatic data into decisions and activities related to agriculture is of major importance.

224. Climate influences planting seasons, the expected yields, production risk for smallholders and credit risks for the financial institutions, as wll as the decision on which practices or investments to implement being economically more convenient and less vulnerable. For example, information on temperature and precipitations: trends, averages, and oscillations allow establishing the climate and production risk per crop, define appropriate cooping mechanisms for the farmers, and adapted risk management strategies for the financial institutions.

225. INAMHI is responsible for the installation and operation of the meteorological stations. For this project, it will be necessary to enable and maintain the stations in strategic locations in order to ensure adequate coverage. In addition, INAHMI will be responsible for transferring the operation of the stations and for providing the necessary technical knowledge to the GADS personnel to take control of the operations and the appropriate maintenance, from the execution of the project.

226. The weather stations have technical specifications, such as data logger to store data, modem to transmit data, a power system and sensors. The data generated at each station must be stored and transmitted to a central server for interpretation. This climate information management becomes essential to adapt to climate change.

227. Local actors will be trained to interpret data obtained from meteorological stations. This training will be carried out in the field and will have as co-executors at least 500 people, from component one and two, of which at least 55% will be women. Focus groups and one to one trainings will be organized for this purpose. The training will include the provision of generic climatic knowledge, and technical aspects on the meteorological stations. Training material such as didactical guides, infographics and technical guidelines for the meteorological stations management, will be distributed during trainings.

228. The climatological information will be integrated with the technological platforms of the Ministry of the Environment and presented online and in an interactive way to facilitate the knowledge about the climate to all the population, including women, elderly and other vulnerable groups. The information will be transmitted in the form of bulletins to be delivered through the mobile phone services network in coordination with INAMHI.

229. The climate information generated by the meteorological stations will be also included in the tools and methodology developed for the assessment of climate risks for financial institutions (output 4), in order to improve the predictability of software solutions used to assess the credits. In such a way, output 6 will also contribute to strengthen the EbA investments implemented by the communities and the EbA credits provided by the financial institutions.

Output 7: Six development plans of local parishes incorporate measures for ecosystem-based adaptation to climate change.

230. The Territorial Planning and Development Plans (PDOTs) are instruments determined by the Constitution, and the Organic Codes for Territorial Organization, Autonomies and Decentralization (COOTAD) and the Planning and Public Finance Plan (COPFP), in force since October 2010. The GADS develop the concerted management of their territory, oriented to a harmonious and integral development.

231. Article 41 of the COPFP states that "Development plans are the main guidelines of the GAD strategic development decisions in the territory. These will have a long-term vision and will be implemented through the exercise of their powers assigned by the Constitution of the Republic and the Laws, as well as those transferred to them because of the decentralization process".

232. PDOTs are a tool used by the GADs located in the project area, based on the good living approach proposed by the government, in which nature has rights. Aspects of climate change are included in the ministerial agreement 137.

233. Therefore, mainstreaming measures for ecosystem-based adaptation to climate change in the PDOTs, will benefit the communities in the parishes.. Ecosystem based adaptation measures assure the alignment between ecosystem conservation and climate change adaptation. By conserving the local ecosystems, agriculture production is strengthened as well as community resilience to climate change.

234. Moreover, the inclusion of ecosystem-based adaptation will be beneficial to the most vulnerable population as the more exposed group to ecosystem degradation and climate events. Ecosystem-based adaptation will hence support inequality reduction and poverty alleviation. The local community thanks to the organization of community workshops will back the inclusion of ecosystem-based adaptation to climate change in development plans.

235. During workshops, the main aspects of ecosystem-based adaptation will be introduced, and then the existing ecosystem adaptation practices already in use in the community will be collected and presented by local farmers already implementing them. This will support knowledge transfer among members of the community and the possibility to adapt best international standards to what has

revealed as already worked. Hence, a catalogue of local practices will be defined and used as a baseline for introducting ecosystem-based adaptation within the PDOTs.

236. The PDOT will include a guide to priority actions to address climate change. This document will help to monitor and evaluate the results and impacts achieved in a transparent manner.

237. Once finalized the PDOTs will be introduced and explained to the local actors, those interested in the project and the community in general. The document will be available in digital format from the parish GAD website, to guarantee the larger as possible spreading. Once the community actors will be trained on ecosystem-based adaptation, the PDOT will be used as both strategic tool to foster adaptation, but also as monitoring and reporting tool for rural development. By introducing elements of climate change adaptation into PDOT the aim is to assure that climate change consideration will be included into parishes' development plan.

Output 8: Strategic plan of communication, education, knowledge transference and scheme of replica

238. The strategic communication plan will ensure that the activities carried out in the project are knowledgeable for all stakeholders. In such a way, that there is an effective and fluid communication of information on the activities that are carried out in the project.

239. Communication will be done using three different approaches: through the project unit, where the project team will socialize information with the local communities on a day-to-day basis whenever they are in the field. Local strategies, where the project unit will work one to one or through focus group with key stakeholders and representatives from local organizations and institutions. Finally, through traditional media such as MAE website and its social network, community radio and local print media whenever considered relevant.

240. Moreover, educational material on ecosystem-based adaptation, including infographics, actual examples based on the local community experience, and interactive learning material will be developed. In the communication and knowledge transfer plan, the actors that participate in the project will be included as much as possible to support community-to-community training and exchange. The interactive and participatory methodology will be privileged, if possible, games illustrating ecosystem-based adaptation will be developed or adapted and used for knowledge transfer.

241. The data and information generated in the project will be published on the website of the main technology platform of the project implemented in output 9 and on the website of the parish GADs.

242. The training will be directed according to the requirements of the community and based on the training activities established in this project, components 1 and 2, which include topics such as forest management, water sources, climate change adaptation, and financial access, organizational and associative development.

243. Specifically, with output 3 of component 2, there is a close link, since farmers and producers of panela, who will be part of the productive sustainability project, must approve modular courses of 9 sessions, 4 will be in classrooms and the remaining 5 will be in the field. Participation in these courses will regard gender equity and access to vulnerable groups. The trainings will be the base to later implement the demonstration farms located in areas where points of critical social, environmental and economic vulnerability are identified.

244. The selection of six demonstration farms with measures of agricultural, livestock and production of panela is included in this output. These farms would include the adaptation measures, the monitoring of the productive performance and the recording of the financial dynamics including all financial movements such as sales, cost of sales, expenses, income, family consumption, final balance. The objective of demonstration farms is to show the possible solutions that could at once increase yields, reduce climate vulnerability and conserve ecosystems. The demonstration farms aim to provide to smallholders a real example of what their farm could look like and what are the main advantages. They aim to stimulate a feeling of proximity with adaption practices and how they can be actually implemented: translating from abstract wording into actual experiences.

245. It is important to remark that technical assistance and the means of access to financial resources in output 3 go hand in hand with this process of strengthening the capacities of farmers.The content will be designed in an interactive format, according to the target population, including children, youth, women and vulnerable groups. They are interested in being considered and informed of all the projects that are carried out under the Río Blanco upper basin.Output 8 will also promote exchange site visits among parishes participating in the project, as part of the exchange and replication of knowledge.

246. Moreover, output 8 will contribute to strengthen the capacity of financial institutions to introduce climate and environmental aspects into their portfolio. This is of key importance to assure the medium term financial sustainability of the project. Indeed awareness raising and direct capacity building will be provided to financial institutions to assess environmental and climatic risks for clients and portfolio, and develop and finance ecosystem based adaptation farm investments.

247. Tailored training on environmental strategies and climate risks will indeed be provided to the management team and loan officers of financial institutions engaging in the project as per output 4. Generating the buy in of loan officers is key, because they direcly interact with clients, perform the credit assessment and provide advices to clients. Supporting capacity building of the management team is important as well,

to assure that environment and climate are included in all the layers of procedures and assessment of the financial institution. Training will be provided during dedicated workshop and small group session. Guided round tables of discussion with loan officers and management team will be organzed.

Output 9: Systematisation of information gathered during the whole project design and implementation using existing informatics platforms

248. The project will develop a technological platform, which will ensure the systematic storage and dissemination of data, information, lessons learned and good practices implemented by the project.

249. The platform will be implemented using the best available technology (such as cloud computing and Big Data) to ensure the handling of a large amount of data and its online availability to all stakeholders and the population.The platform will serve to monitor climate information generated by the meteorological stations and platforms used by the Ministry of Environment. Data and information will be available online to be accessed from any mobile device and from anywhere within the project area.

250. The platform will be integrated with the current technological platforms of the Ministry of Environment. The integration of the platforms will allow access to the stakeholders in a centralized way to the data and information generated by the meteorological stations, parish GADs, and the Ministry of the Environment.

251. The use of the software solutions for credit and risk assessment of financial institutions (output 4) of farmers' practices will contribute to generate data that will be shared through the above-mentioned platform. This will hence contribute to transfer the institutional learning of financial institutions to the community and support replication of the present project to other locations and with other financial institutions in the country.

252. The following table presents the activities for component 3:

Outcome	Output	Activities

4. Local population and parish governments with increased capacity to implement climate change adaptation measures+	6. At least 6 parishes trained to take care and use meteorological information generated by meteorological stations currently installed	27. Training 500 families in the use of climate data and its application in their activities such as agriculture and livestock. This training will be address for 55% percent of women. Including field visits, food and transportation. An appropriate mechanism to transmit climate information to the population will be developed. 28. Designing of interactive content and generation of newsletters to training GAD population in the area including women associations, older adults and vulnerable groups. Strengthen capacities to GADs´ technical staff to support the process of changing administrative operations from INAMHI to GADs. 29. Integrating the digital media technologies for communication plan and addressed it to the population including women, older adult, youth people and children.
	7. Six development plans of local parishes incorporate measures for ecosystem-based adaptation to climate change.	30. Conducting a technical study to determinate which climate change adaptation measures must be added in development and territorial planning plans. 31. Gathering information on climate change adaptation measures to be added, such as indicators and statistics, into development and territorial planning plans. The indicators should include gender information and vulnerable groups for climate change. 32. Developing new development and territorial planning documents adding climate change statistics and information about gender and vulnerable group's climate change issues. 33. Training to population including associations, organizations and other stakeholders of the project about climate change adaptation measures incorporated in the PDOTs. 34. Socialize new PDOTs documents with the project beneficiaries including associations, organizations and the population in general

	8. Strategic plan of communication, education, knowledge transference and scheme of replica	35. Developing a communication plan addressed to stakeholders in the project including specific women associations and organizations. 36. Integrating the digital media for communication plan and addressing it to the population in general including women, older adults, youth people and children. 37. Sharing lessons learned and experiences with project stakeholders, and replicate knowledge to other similar projects in the country trill demonstrative farms applying sustainable methods for agriculture, livestock and panela production 38. Training modular courses on sustainable agriculture and good agricultural practices open to associations and selected farmers to participate. 12 modules, 6 theorists, 6 in the field and on-site supervision within 6 months of completing the course. At least 50% women participation. 39. Training for all Microfinance Institution (MFI) staff participating in climate risk, green credit and climate change issues with a focus on microfinance. 40. Certification of organic crops or good agricultural practices for the production of panela, mortiño wine or crops of sugar or naranjilla, of those graduates with better performance in their crops.
	9. Systematization of information gathered during the whole project design and implementation using existing informatics platforms	41. Developing a technological platform to manage knowledge and information about climate change, using disruptive technologies such as big data and cloud computing. 42. Integrating technological platform into other technological platforms used by the Ministry of Environment. 43. Sociability of the technological platform with all stakeholders in the project including associations and organizations.

Table 23: Key activities in the component three

B. 1. Describe how the project provides economic, social and environmental benefits, with particular reference to the most vulnerable communities, and vulnerable groups within communities, including gender considerations.

253. The ecological vulnerability of the watershed supposes also a socioeconomic vulnerability of the societies living in these areas; especially those already vulnerable like women, children, elderly and disabled (vulnerable groups). By historical and socioeconomic issues, these groups are the most exposed in any society and particularly in those of frontier where social life depends on direct natural resource extraction. In this understanding, climate change and its expected impacts on nature

and society will particularly affect watersheds and women and indigenous people as the most vulnerable in natural and social environments.

254. Considering the issues of social and natural vulnerability and the expected climate change effects, the following paragraphs present a quick concept to identify the benefices to vulnerable groups by the different project activities (Figure 22). This information analyzes the situation of the rural jurisdictions in which lie the critical part of this area and identify the stakeholders and their perceptions regarding weather and climate change issues as presented below (a more detailed explanation can be reviwed in **Error! Reference source not found.**).

Co-executors

255. Direct co-executors are defined as those residents, organizations or institutions that will receive a transfer of resources or technology from the project's funds. Within this group of principal co-executors are:

- Parish governments of Las Pampas, Palo Quemado, El Chaupi, Aloag and Manuel Cornejo Astorga and Municipal govermment of Sigchos that will mainstream the climate change variable and adaptation measures in their planning and land use zoning. It is also expected to mainstream adaptation, with a gender perspective, into the plans for the rural area of Sigchos[30]. These parishes will also have improved forest conservation, better agriculture production, access to hydro-meteorological information, and enabling conditions for multi-level dialogue and collaboration. The population in the rural areas is about 10,542; and 6,167 in populated area, with a very similar proportion between men and women.At least 30 technical staff, promoting women's participation to reach at least 50%, of partcipants, from the parish governments and municipality of Sigchos will benefit from training on adaptation to climate change.
- At least 200 stakeholders will benefit from the exchange of experiences. Women's groups and/or organizations will be identified and targeted to benefit from these activities.
- At least 375 farmer families will benefit from sustainable farming and livestock practices and watershed management. Women led households and farms will be identified and targeted to benefit from these activities. If needed, extra training will be provided to enhance access for women.Vulnerability groups are identified in the Stackholders (2016) and Gender analizes (2017).

256. Indirect co-executors are those persons or institutions that will participate in the project's activities without directly receiving project funds. Within this group the principal co-executors are:

[30] Sigchos is a canton formed by four rural parishes (i.e., Chugchilán, Isinlivi, Las Pampas and Palo Quemado) and an urban parish (Sigchos). The urban parish is very large, but the urban centre is small. In 2010, the canton had 21,900 people, 91.1% was rural population. Rural parishes have a parish government, but the urban parish is managed by the municipality.

- Water users, particularly women, from the Río Blanco drainage basin.
- About 49,367 incuding people who live in rural areas and populated spots of the drainage basin.
- HIDROTOAPI hydroelectric plant and the users of the electricity it will generate.

On the next figure, a set of activities and benefices to vulnerable groups is detailed:

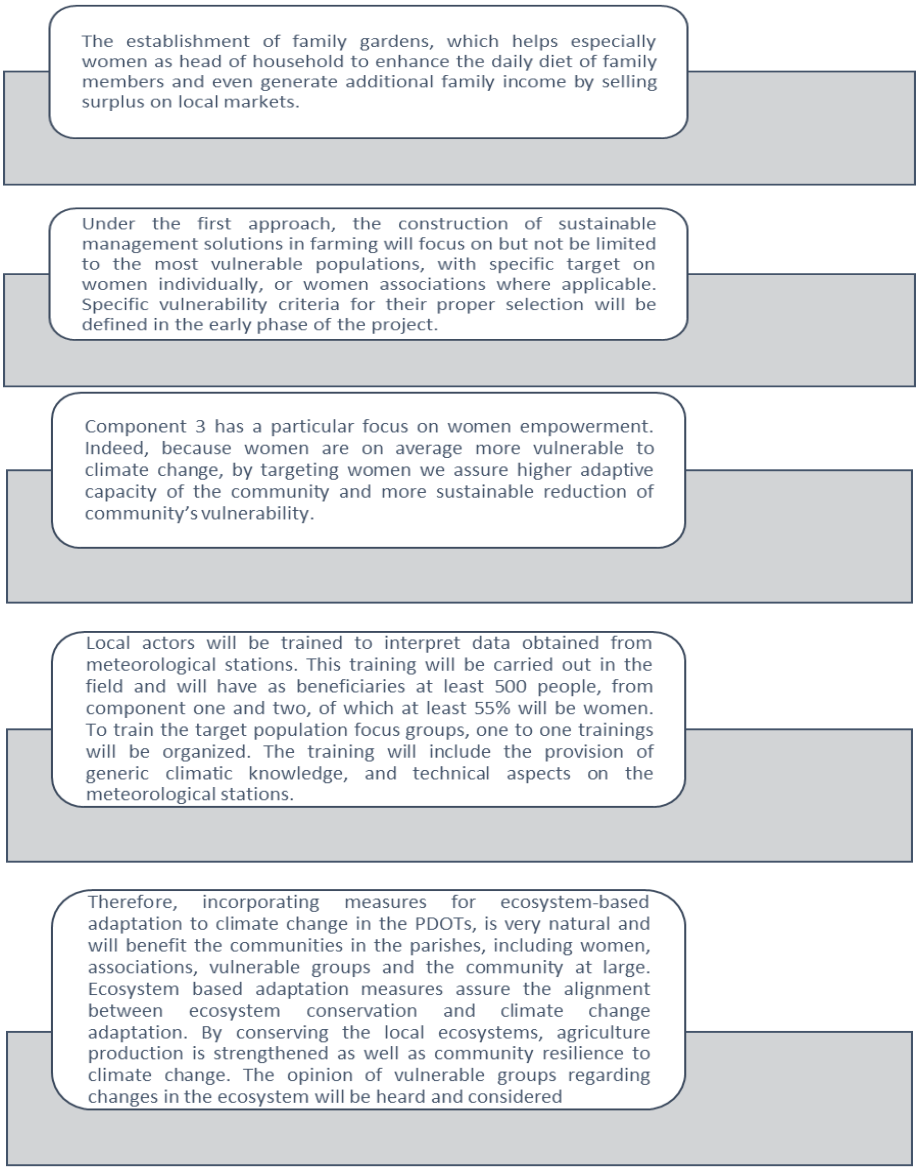


Figure 27. Key activities and benefices to vulnerable groups

257. Moreover, the project is designed to support broader impact within the ecosystems and the communities. The project targets indeed key actors in the communities able to generate multiplier effects with positive impact on the full commnunity and the ecosystems it depends on. For this reason, it will work also with technical providers, financial institutions, agronomists, value chains actors in agriculuture, private and

public local institutions, with the aim to generate systemic changes towards sustainble and adapted practices.

Economic benefits

258. Farmers that implement sustainable farming practices will benefit from an increased yield and income, and at the same time, will reduce the risk of losses due to agricultural practices not adapted to adverse climate impacts. It is expected that these farmers will catalyse the use of improved practices to a larger number of producers.

259. As the respective adaptation options only activities that will increase the farming household's economics will be promoted, ensuring a sustainable increase in household income.The project intends to make farmers subjects of lending eligibility, which will help them to further strengthen their economic development.

260. Furthermore, enhanced hydro-meteorological information will contribute to prevent adverse effects in agriculture and livestock, and give relevant climate information to be considered into the development plans (PDOT).

261. HIDROTOAPI will benefit from ensuring sufficient water flow for power generation and will avoid a significant increase in maintenance costs due to increased frequency in changing out parts or doing major maintenance or overhauls due to the expected increase in suspended solids.

262. The parishes will benefit of a growing rural economy, able to attract financial service providers and scaling up sustainable practices for the entire community.

Environmental Benefits

263. The conservation of a large vegetation cover will sustain the water cycle by ensuring condensation in the cloud forest and related flora. In addition, these areas will continue to support local biodiversity (including high-value conservation species) and connectivity among diverse habitats and ecosystems.

264. The Andean Cloud Forests are vital in the uptake and regulation of water within the hydrological cycle. They capture moisture from the cloud cover, acting like a sponge that absorbs and retain water during the wet season and release it during the dry season. This is why maintaining the most possible forest cover is crucial to withhold the impacts of the foreseen climate change.

265. Conserving the vegetation cover of the Río Blanco upper watershed will also contribute to protect valuable biodiversity. The Andean Cloud Forest on the western slopes of the Ecuadorian Andes is very rich in biodiversity. There is limited information about the cloud forest of the project area, but an in-depth analysis in a close area identified 1,640 species of vascular plants. In the Rio Guajalito Reserve, about 2,800 vascular plant species have been reported; of these about 100 species are endemic.

266. In the Río Toachi-Chiriboga IBA, 450 bird species have been reported. The area host threatened species like *Pachyramphus spodiurus* and *Ognorhynchus icterotis* (both classified Engangered in the IUCN Red List). In addition, in Rio Guajalito Reserve about 40 species of mammals have been reported, including the spectacled

bear (*Tremarctos ornatus*) and the pacarana (*Dinomys branickii*) – both classified Endangered in the Ecuadorian Red List --, and the neotropical otter (*Lontra longicaudis*) (classified Vulnerable in the Ecuadorian Red List).

267. In the Reserva Ecológica Los Illinizas and its surroundings IBA, about 257 bird species have been reported. The area host threatened species that are endemic of the cloud forests like *Grallaria gigantea*, *Grallaria alleni* (both classified Vulnerable in the Ecuadorian Red List), and *Haplophaedia lugens* (classified Near Threatened in the Ecuadorian Red List). The area also host threatened mammals like the spectacled bear, the puma (*Puma concolor*) (classified Vulnerable in the Ecuadorian Red List), the collared peccary (*Pecari tajacu*) (classified Near Threatened in the Ecuadorian Red List), and the endemic Ecuadorian spiny pocket mouse (*Heteromys teleus*) (classified Endangered in the Ecuadorian Red List).

268. The project will promote two main implementation strategies, on one hand supporting forest conservation, and on the other hand, fostering the development of more sustainable agricultural activities making a responsible use of ecosystems

269. Hence, the community will appreciate ecosystems not only as landscape but also as a basis for their production, a mean to reduce their vulnerability. This will contribute to sustain the protection of ecosystems and to strengthen community links needed for their economic and social development.

Social Benefits

270. Stakeholders from the lower part of the water system will benefit from increased social capital. This can be a powerful catalyst for further action to improve the livelihoods of local groups. The improved dialogue, networking, and collaboration among stakeholders will be a major contribution to local development.

271. Farming families will benefit from improved practices. The project will pay particular attention to the role of women and other family members (e.g. children and the elderly) in local farms to adapt, as much as possible, the new sustainable farming practices to the dynamics of the farming families. Women will be specifically targeted to benefit from all project activities.

272. Local communities will also benefit from an inclusive approach. All project actions will be, to a feasible extent, gender and age sensitive and will consider the needs of persons with disabilities.

273. Mainstreaming adaptation into daily actions and decision-making will also generate major benefits for local communities. This will allow them to adjust their lifestyles and livelihoods to the impacts to be generated by climate change.

274. Better hydro-meteorological information provided to the early warning systems will contribute reduce the risk of impacts from landslides and flooding.

275. In the long-term, HIDROTOAPI´s greater stability in electrical generation is an additional benefit at a national level.

276. *Climate Change Gender Action Plans (ccGAPs)* build on a country's national climate change policy, plan or strategy, exploring into gender-specific issues by priority sector and creating innovative action plans to enhance mitigation, adaptation and

resilience-building efforts for women and men in every community. In the project context, the National Climate Change Strategy (MAE,2012) establish the gender and vulnerable groups as a priority sector. **Error! Reference source not found.** Presents the analysis of vulnerable groups and gender. The document consists of:

- Introduction and national and international legal framework
- Conceptual framework: Impact of climate change on women and vulnerable groups. Table 1 shows the index of femininity in the last census in 2010 for Ecuador. Table 2 Income of the economically active population. Table 3 Population in the project area differentiated by gender. Table 4, the disaggregation of population data in the project area.
- Gender analysis: Description of social, economic and cultural characteristics by 2018

Gender Action Plan

- Participatory processes that take into account gender: Participation was a gender focus in the workshops held with the communities as presented in **Error! Reference source not found.** women participated actively in the decision-making process of components 1, 2, and 3 activities. Out of 40 participants, 22 were men and 18 were women. The workshop was held in the communal house of the Unión del Toachi locality.
- Initial Gender Assessment: **Error! Reference source not found.** Table 6 Comparison of Population Censuses from 2001 to 2010 in the Sigchos Parish. Table 7 illiterate by parish. Table 8 ethnic self-identification by cantons. Table 9 Education by cantons. Table 10 Labor Market. Table 11 Poverty for unsatisfied basic needs in Canton. Table 12 single mothers. Table 13 Dissagregated data by gender and economically active population by parish. Table 14 Cantonal productive activities. Table 15 Women by associations and productive activities
- Baseline of the project disaggregated by sex: **Error! Reference source not found.** presents the results of the Feedback Workshop where proposed activities where presented to the community. The workshop was carried out in July 24, 2017, with a total of 89 assistants, of which 40 men and 39 women. From these workshops, awareness of the impact of climate change began to raise , as well as the experiences of future co-executors are mentioned in the final document, having a baseline of vulnerable groups. For more information, the model of the surveys that were applied is presented (see page 9 - 11, **Error! Reference source not found.**)
- Training activities and capacity development: Corresponding to component 2 and 3.
- Governance mechanisms: National and international legislation.

277. As a result of this Gender and Vulnerable Groups Analysis (**Error! Reference source not found.**), gender entry points for project Log Frame have been identified (section E part III). To monitor project implementation, some gender-sensitive indicators have been suggested to be incorporated in the Monitoring and Evaluation

Plan, the concept is shown below and the activities are described in the following paragraphs:

Figure 28. Gender Action Plan

i. Initial Gender Assessment: To be presented before first disbursement. It should contain the following: (i) gender analysis of farming and agricultural value chains, including an assessment of gender division of labor in local farming and agricultural practices (land preparation, ploughing, manuring, seed purchase, sowing, weeding, harvesting, processing, grain storage, folder collection, water collection, feeding, cleaning/bathing, milking cows, milk processing, dung collection, marketing). Include assessment in terms of use, access and control of natural resources differentiated by gender; (ii) gender assessment of existing differentiated needs and demands of farmers and local producers to benefit from project, this part should also mention how existing risks and problems affect differently to men, women and vulnerable groups. To stablish the needs and demands, day-to-day activities of men and women should be clearly stated. Include the dynamic and use of time from children or other vulnerable groups, which will be usefull to asses time availability of women for future planned training; (iii) identification of existence of gender-specific crops and products.

ii. Sex-disaggregated project baseline: The project baselines should contain at least: heads of households; land owners; farm owners; farm workers.

iii. Gender-responsive participatory processes: As part of the project communications plan with communities, should recognize women as primary users of forest resources in project design, implementation and evaluation. These mechanisms should effectively engage both men and women in decision-making processes, additional training targeted to women may be needed in order to ensure their full and effective contribution. In addition, gender-responsive processes may include the use of women-only interviews and gender-specific focus groups and group consultations (UNREDD 2013).

iv. Training and capacity building activities: Desripction of activities to be implemented under project components, with either local farmers, general population, parishes and other public officers, should promote women's participation and be gender-

sensitive, taking into consideration specific demands (location, adequate schedules, childcare facilities and/or other special arrangements that may encourage women's assistance).

v. Land titling processes: If such mechanisms are to be established through project implementation, joint tenure of land should be promoted. In addition, it should be assessed whether widowers and single women face additional restrictions to own land, and introduce corrective measures to lift these barriers.

vi. Financing products: When new financing products, such as credit schemes and guarantees, are to be implemented as project outputs, they should be designed taking into consideration differentiated gender needs. Women tend to have less access to credit, usually due to lack of collateral, but also to lesser understanding of finance concepts, and may prefer collective credit schemes. These special needs should be taken into account when designing these products, to ease access for women to participate.

vii. Institutional governance mechanisms to be created under project implementation, such as committees for a Water Fund and/or for a Seed Fund, should incorporate a female quota (i.e. 20%) in their structure. In addition, gender-sensitive hiring procedures should be taken into account. The participation of women in decision-making processes should be promoted and documented.

viii. When sourcing staff and consultants, gender equality will be a guiding principle. Using gender-sensitive language in hiring procedures, determining a quota (i.e. 30%) or facilitating training for women so they can access traditionally male-dominated positions, are some of the measures that could be implemented. In addition, these procedures can be included as requirements for contractors.

ix. It would be advisable to design and implement local development plans (for the parishes) to be gender-sensitive.

x. If other studies and assessments need to be made, it is recommended that they incorporate a gender perspective.

Summary of benefits by component

Component/ Benefits	Social benefit	Key Indicator	Economic benefit	Key Indicator	Environmental benefit	Key Indicator
Component 1: **At least 230,000 ha of native vegetation is conserved to reduce the impact of climate change on the hydrological cycle under integrated watershed management**	Improvement of quality of life, the data have been obtained from the web page forestmanagement and wizetime indicates that: 22 trees are required to supply the oxygen demand of a person per day. 0.41 hectares with trees (1 hectare is equivalent to 10,000 square meters, let's say an urban block), produces enough oxygen per day for 18 people.	6/6 GADs in target bio-corridor with TLUP that incorporate specific provisions for Bio-corridor of conservation Indicator: # GADs that Biocorredor has incorporated / 6 *100	Natural persons with property equal to or less than 20 ha, will receive a value of up to USD $ 60 / ha / year. Equal or less than 50 hectares will receive the maximum value of USD $ 30 / ha / year. With an area of up to 100 ha, they receive as an incentive the maximum value of USD $ 30 / ha / year for the first 50 ha, and of USD $ 20 / ha / year for the next 50 ha. Between 101 and 500 ha, they will receive USD $ 30 / ha / year for the first 50 ha; USD $ 20 / ha / year for the next 50 ha; and, USD $ 10 / ha / year for all additional ha between 101 and 500 ha. The same mechanism will be applied for the following categories. The returns for the same hectare of land could grant US $ 2 per year for grazing uses, for a one-time US $ 1035 sale of commercial timber. If no action is taken to reduce emissions, each tonne of carbon emitted will cause a loss of US $ 85 in the world economy.	30% of reduction of current use of wood Indicator: # has been destined for wood use / # has deforested * 100	Within the National Forest Control System Project presented to SENPLADES by the Ministry of the Environment indicates the environmental benefits of the conservation of plant cover indicates that the price of carbon fixed per hectare is $ 134. 17% of deforestation and forest degradation accounts for almost 17% of global greenhouse gas emissions (GHG). In 2006 a study called by the Treasury of the United Kingdom (http://www.hm-treasure.gov.uk/sternreview_index.htm) concludes that reducing deforestation offers the best alternative to reduce emissions at relatively low cost. The study showed that in eight countries, responsible for 70% of the total emissions, due to land use change, one hectare of forest can be valued as US $ 25,000 in terms of carbon sequestered at a carbon price of US $ 30 to US. $ 50	# of ha of forest conserved in the Bio-corridor Indicator: # ha Biocorridor / # has total conservation * 100
Component 2 **Adapt farming practices to new climate change conditions enable their sustainable climate smart financing**	The increase of the agricultural production and of the income will bring an improvement of the living conditions of the producers. Experiences in other sectors tell us the benefit as it is: Good agricultural practices help improve farmers' incomes in Lao RDP[31] supported by FAO by 50% than by applying conventional agriculture.	50% women and 50% men including also vulnerable groups. #women involved / total of the beneficiary population * 100	The gender perspective promoted by the project will improve self-consumption, small-scale income generation (agricultural activities, preparation and sale of products, off-farm work) and care of the family production unit. In the Comparative Study of production costs in organic and conventional agriculture indicates that conventional farming techniques are invested 12.7% more in raw materials, while labor costs are 13.8% higher in organic farming, this has an impact on 1.9% on variable costs and 3% on total costs.	# institutions have trained their personnel on sustainability topics, including EbA and Climate Change/ Indicator	Erosion risks will be avoided in the occurrence of heavy rains causing the decapitation of the surface horizon and the exposure of the low permeability layers, lower content of organic matter, increase of pests.	At least 250 ha of pasture and 250 ha of crops apply sustainable farming practices Indicator # has sustainable agriculture

[31] http://www.fao.org/in-action/good-agricultural-practices-help-raise-farmers-incomes-in-lao-pdr/es/

Component/ Benefits	Social benefit	Key Indicator	Economic benefit	Key Indicator	Environmental benefit	Key Indicator
				# total of institutions * 100		/ # has total * 100
Component 3 **Strengthen local capacities and share lessons**	Incorporation of the perspective of gender through the participation and dedication quotas foreseen in the project. The growth of the sector depends on the expansion of the consumption of biological products; In this sense, it is women who decide and acquire up to 90% of food, which means that they must be considered as protagonists in the decision making of food consumption. The work of Allen and Sachs (1992) is a pioneer in the analysis of the production of organic foods from the point of view of gender, in which the authors highlight the need to question and analyze the aspects of class, race and gender. in relation to sustainable agriculture so that it does not constitute only an agriculture capable of reducing environmental impacts.	At least 500 families trained in the use of climate date, with at least 55% women's participation Indicator # families trained climate change / # families affected by the project * 100	Increased capacity to develop and implement approaches to efficient adaptation to climate change that leads to the protection of farmers' property and income. In 2017, farmers have benefited from the purchase of the MAGAP agricultural kit, which includes a subsidy of 40% from the Ministry and 60% financing from BanEcuador B.P. Similarly, the credit for coffee, cocoa, corn and rice is still valid to promote the development of this sector of the national economy[32].	At least 6 trainings provided on adaptation finance and 6 training for climate risk in two financial institution Indicator # training on adaptation financing / 8 * 100	Greater knowledge and awareness of climate change and its impacts will help raise awareness about environmental protection. Within national policies, the topic of Mitigation and Adaptation to Climate Change is addressed. Framework for the preparation of the IDB's 2012-2017 Strategy in Ecuador in line with climate change mitigation, PNBV includes the following goals: a) Increase the 5% of the territory under conservation or environmental management; b) Reduce the rate of deforestation by 30%. The experience in Ecuador indicates that the annual rate of deforestation has been reduced, in the year 205 it was 1.74, 2013 in 1.22 in the year 2015.	7 hydro-meteorological stations providing climatic data in a regular bases and located accordingly to technical criteria by INAMHI

Table 204: Benefits and indicator by components

[32] https://www.banecuador.fin.ec/noticias-banecuador/boletines-de-prensa/banecuador-financia-adquisicion-kits-agricolas-entrega-credito-siembra-maiz/

How the project will avoid or mitigate negative impacts, in compliance with the Environmental and Social Policy of the Adaptation Fund.

278. Project activities have been screened against the environmental and social principlaes and an Environmental and Social Mitigation Program (ESMP) have been developed (**Error! Reference source not found.**)

279. Specific activities for the biocorridor and farm-level plans will be outlined during the implementation of the project as unidentified sub-projects (USP). The environmental ans social risk of these activities must be addressed when the project starts its implementation.

280. Within the USP, there is the possibility of identifying adverse environmental and social risks during implementation that were not expected during the design of the project . To anticipate theserisks, the Project Unit will identify the possible environmental and social risks associated with each of the activities planned for the year and will design and schedule the mitigation measures accordingly, as well as the budget required for its implementation. This analysis will be carried out applying the same methodology used in this project to identify the risks against the environmental and social principles applicable to this project.

281. The identification of risks, impacts, mitigation measures and implementation process is the same as that carried out for the project during the design phase. The design of mitigation measures will be evaluated in accordance with the ESP and the gender policy of the Adaptation Fund. All risks identified will require different mitigation measures and a responsible for compliance. Monitoring and verification of compliance is required for all activities.

282. All unidentified sub-projects (USP) need to be assessed against the Environmental and Social Risk Identification Mechanism (Annex 7) before its approval. In addition, mitigation activities will be integrated to the ESMP and in the regular procedures for project monitoring and evaluation.

283. An unidentified activity or subproject is one that at the time of submission of the proposal cannot identify environmental and social risks. This may be due to the time elapsed from the evaluation in the field until the project is approved and implemented. The process to follow with USP is the following: :

Step 1. Design of Activities.
Step 2. Evidence-based risk identification
Step 3. Present documentation/Evidence for compliance for each principle according with AF and national requirements.
Step 4.Impact assessment and ESP compliance for USP
Step 5: Mitigation Measures
Step 6. Verification for Approval
Step 7. Monitoring of Compliance

C. Describe or provide an analysis of the cost-effectiveness of the proposed project.

284. Within the project area, the current Business-As-Usual (BAU) agricultural development model has encroached upon forest and riverside areas. The production methods applied within the local agricultural and livestock sector remain traditional and have not been optimized for efficiency. Any growth of the local agricultural sector therefore entails a land use change. In a climate change scneario increasingly affecting the area, non-intervention carries a high cost of opportunity. While it is true that some GADs have incorporated isolated adaptation measures into their development plans, their impact has been extremely limited.

285. The project, in turn, will directly benefit about 553 families (2,600 people) in the project area. Additionally, it will indirectly benefit the local parishies communities (ca 14,000) and entire population of the Río Blanco upper watershed system (ca. 49,367 people). The project will contribute to strengthen the adaptive capacity of local communities and stakeholders reducing the level of future impacts generated by climate change.

Component	# of Co-executors (families)	Assumption(s)	Activity	Target	Investment	Cost per unit target
C1. Conserve vegetation cover	178	50% from highlands and 50% lower basin	Improve management of protected forest.	230,000 ha	USD500,000	USD2.17/ha
			Increase conservation area	1,000 ha	USD450,000	USD450/ha
C2. Adapt farming practices to new climate change conditions, enabled by sustainable climate smart financing	375 (250 for crops and 125 for livestock)	1 hectare will be dedicated to this project per farmer and 10% of the average extension (20 ha) per livestock farm	Sustainable farming practices and livestock adjusted to local realities are being introduced and implemented with assistance of financing mechanisms for adaptation measures	500 ha 375 fams	USD420,000	USD840/ha USD1120/fam

Component	# of Co-executors (families)	Assumption(s)	Activity	Target	Investment	Cost per unit target
			At least 1 long term financing mechanisms has been piloted or introduced	553 familias	USD420,000	USD759.5/fami
C3. Strengthen local capacities and share lessons	553 directly 14000 indirectly local communities 49367 indireddly in river basin	Co-executors both component 1 and component 2	At least 6 parishes being built capacities and prepared to manage and use meteorological information.	6 parishes	USD160,000	USD26,666/parish
			Six development plans of local parishes incorporate measures for ecosystem-based adaptation to climate change.	14,000 people	USD80,000	USD5,75/people
			Strategic plan of communication, education, knowledge transference and scheme of replica, including demonstration farms. Plus training on adaptation finance to financial institutions	553 families	USD120,000	USD217/families
			Systematisation of information gathered during the whole project design and implementation using existing informatics platforms	553 families	USD40,000	USD72/families

Table 215: Cost per unit target by components

286. The project will use existing structures and actors to implement all interventions. Relevant best practices in the national and/or regional context will also be leveraged (e.g. ACUS, Socio Bosque).

287. A core element of achieving the projects' target benefits lies on influencing farming practices. To achieve this, farmers will be equipped both with specific expertise and

best practices aligned to their area of activity in their local context, as well as with the tools required for this purpose. As many factors influence this equation, it is evident that cost-benefit analysis needs to be conducted on an individual level to achieve maximum impact. On a project level, the focus will lie on conducting a case-by-case analysis and monitoring relevant micro-indicators over the project implementation.

288. In terms of the tools, selection multicriteria for the identification of suitable adaptation measures for individual farmers need to be flexible and take into account each farmer's specific situation based in the ABC methodology (MAE-GIZ 2017) [33], such as:

- Access to important infrastructure such as roads,
- Slope of the farmsand grazing grounds,
- Soil texture and quality,
- Actual crops cultivated or livestock bred, including varieties and types,
- Availability of critical inputs.
- Pricing of inputs in each area, and
- Conventional panela production

289. The combination of these critical productivity drivers will not only determine the productivity of farmers under business-as-usual scenarios in face of adverse climate impacts, but also define what actual adaptation measures offerthe optimum results but also if their implementation is feasible at all. For example, if certain inputs for the implementation of adaptation measures are not available, cannot be transported to the farm due to the lack of access roads or are prohibitively priced, this must be analyzed and the impact taken into account on a case-by-case basis.

290. In order to take advantage of the best relevant practices, the project carried out a multicriteria analysis of the key activities to be developed, followed by a cost-benefit analysis.

Multi-criteria analysis for the definition of key activities in each of the components:

291. The cost-effectiveness analyses, was based on four concepts, which results from the interaction between documentary information, determination of cost per key unit target, evaluation on keys activities and finally the multi-criteria and cost benefit by component summarized in the following diagram:

[33] Multicriteria Analysis. Environment Ministry - GIZ 2017

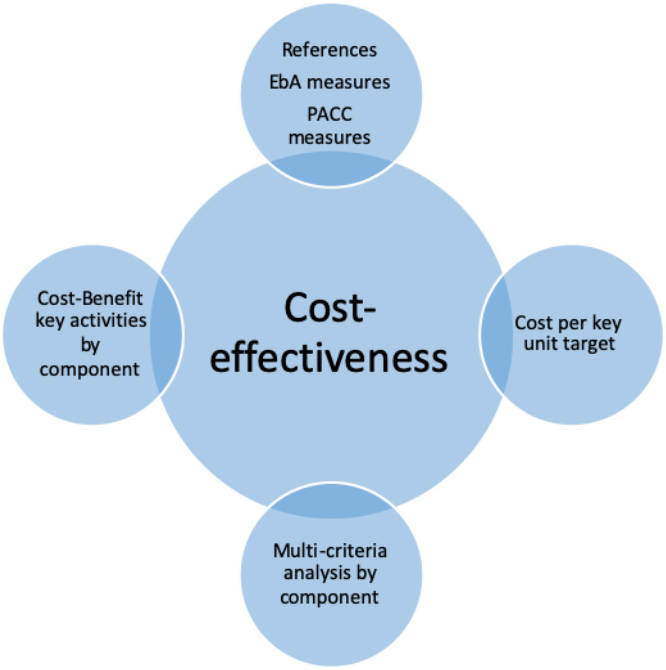


Figure 29. Cost-effectiness analysis

Cost-Benefit Analysis Component 1

292. For the analysis of component 1, it has been considered an initial investment of $760.000, total co-executors of 2.800 families which gives an approximate of 14.000 people covering a total surface of 230.000 hectares, a 30% level of drought affectation and the average inflation of 4.3%. The annual maintenance cost is $19.000 that corresponds to 2.5% of the initial investment.

293. The implementation of measures detailed in component 1 are expected to diminish the impact of drought and deforestation as well as the consequent economic losses to farmers this could imply, by increasing its crops yielding by 3%. For this analysis, the three principal components to be preserved were considered: conservation, carbon and the cost of preserving sediments under a reasonable level.

Total hectares	1.000										
Element	**Hectare**	Percentage	Yield qq/ha	Cycles	Total year production (qq)	Price per qq	Total Value	Value of Real production	Benefit of the measure by reduction of drought impact	Benefit per increase in yielding	Total Benefits
Conservation	500	50%	19,6	1	9800	30	$ 294.000	$ 205.800	$ 88.200	$ 6.174	$ 94.374
Carbon	300	30%	5,6	1	1680	15	$ 25.200	$ 17.640	$ 7.560	$ 529	$ 8.089
Sediments	200	20%	8	1	1600	8	$ 12.800	$ 8.960	$ 3.840	$ 269	$ 4.109
							$ 332.000	**$ 232.400**	**$ 99.600**	**$ 6.972**	**$ 106.572**

Table 226: Cost – benefits component 1
Source and methodology: MAE, 2016[34].

294. With the conventional panela production system, the process takes roughly six hours/580 liters of cane juice (MAGAP 2017). The new technology and measures proposed help to reduce the time invested by farmers for the panela production, collecting water and in implementing inefficient low-yielding practices (four hours/580 l) that could threat their surrounding landscape and ecosystem services. This last point is a non-monetary benefit that could increase their life quality.
295. The conservation value was calculated based on the fixed rates that Socio Bosque program has established for its operation. The amount of carbon has been determined accordingly to the price paid per hectare in the carbon market[35] (estimated) and the sediment value has been calculated considering the established price in referential projects to dredge due to sedimentation accumulation using as a reference the national system of public hiring Sercop: CONPC-APG-001-2014[36].

296. The result of the cost-benefit analysis with the aforementioned data shows that the project is profitable as it has an internal return rate of 5%, which is a very reasonable number considering that this is a conservation project focused on protecting and preserving ecosystem services. This amount does not include the possible increases in yield or co-benefits in other areas of agriculture for the implementation of other adaptation measures (livestock management and the improvement of ovens for panela production). At the same time, the implemented measures help to reduce the time invested by farmers in collecting water and in implementing inefficient low-yielding practices that could threat their surrounding landscape and ecosystem services. This last point is a non-monetary benefit that could increase their life quality.

297.

10 years time horizon	r=3%	r=5%	r=10%
Net present value of benefits	$1.128.332	$1.034.310	$ 848.624
Net present value of costs	$ (961.163)	$(944.400)	$ (911.295)
Net present value (NPV)	$ 167.169	$ 89.910	$ (62.671)
Cost/Benefit relation	1,17	1,10	0,93

[34] Environment Ministry (MAE) and Cooperación Internacional Alemana (GIZ). 2016. Policy Brief, Manual para la valoración económica de medidas de adaptación y mitigación del cambio Climático en el Ecuador. 8. P. Mafla, S; Chiriboga, M-V; Guzmán, D; Fuertes, F; Albuja, M-V; Arroyo, J-A; Gavilanes, C.
[35] Carbon Market Reference: https://www.sendeco2.com/es/precios-co2
[36] SERCOP: CONPC-APG-001-2014:
https://www.eluniverso.com/noticias/2014/05/10/nota/2940221/fiscalizacion-dragado-canal-aun-adjudicar

Internal rate of return (IRR)	8%

Table 27: Internal rate of return component 1

298. The following Table 8, shows that the initial investment with 3% of discount rate will have a return of $1´128.332 USD from which we deduct the costs of 961.163 and the result of the NPV is $167.169, which shows that the project is profitable under this rate of discount.

	0	1	2	3	4	5	6	7	8	9	10
	Año 1	Año 2	Año 3	Año 4	Año 5	Año 6	Año 7	Año 8	Año 9	Año 10	Total
Initial investment	($ 760.000)										
Maintenance	$ (19.000,00)	($ 19.817)	($ 20.669)	($ 21.558)	($ 22.485)	($ 23.452)	($ 24.460)	($ 25.512)	($ 26.609)	($ 27.753)	
Costs to NPV	($ 779.000)	($ 19.240)	($ 19.483)	($ 19.729)	($ 19.978)	($ 20.230)	($ 20.485)	($ 20.744)	($ 21.005)	($ 21.270)	($ 961.163)
Economic Benefit	$ 106.572	$ 111.155	$ 115.934	$ 120.919	$ 126.119	$ 131.542	$ 137.198	$ 143.098	$ 149.251	$ 155.669	
Benefit to NPV	$ 106.572	$ 107.917	$ 109.279	$ 110.658	$ 112.055	$ 113.469	$ 114.901	$ 116.352	$ 117.820	$ 119.307	$ 1.128.332
NPV (DR=3%)	($ 672.428)	$ 88.677	$ 89.797	$ 90.930	$ 92.078	$ 93.240	$ 94.416	$ 95.608	$ 96.815	$ 98.037	$ 167.169

Table 28: DR3% component 1

299. The following table 29Table 29, shows that the initial investment with 5% of discount rate will have a return of $1´034.310 USD from which we deduct the costs of 944.400 and the result of the NPV is $89.910, which shows that the project is profitable under this rate of discount.

	0	1	2	3	4	5	6	7	8	9	10
	Año 1	Año 2	Año 3	Año 4	Año 5	Año 6	Año 7	Año 8	Año 9	Año 10	Total
Initial investment	($ 760.000)										
Maintenance	($ 19.000)	($ 19.817)	($ 20.669)	($ 21.558)	($ 22.485)	($ 23.452)	($ 24.460)	($ 25.512)	($ 26.609)	($ 27.753)	
Costs to NPV	($ 779.000)	($ 18.873)	($ 18.748)	($ 18.623)	($ 18.498)	($ 18.375)	($ 18.253)	($ 18.131)	($ 18.010)	($ 17.890)	($ 944.400)
Economic Benefit	$ 106.572	$ 111.155	$ 115.934	$ 120.919	$ 126.119	$ 131.542	$ 137.198	$ 143.098	$ 149.251	$ 155.669	
Benefit to NPV	$ 106.572	$ 105.862	$ 105.156	$ 104.455	$ 103.758	$ 103.067	$ 102.380	$ 101.697	$ 101.019	$ 100.346	$ 1.034.310
NPV (DR=5%)	($ 672.428)	$ 86.988	$ 86.408	$ 85.832	$ 85.260	$ 84.692	$ 84.127	$ 83.566	$ 83.009	$ 82.456	$ 89.910

Table 23: DR5% component 1

300. The following 30, shows that the initial investment with 10% of discount rate will not be profitable under this rate given that the profitability of this component will be of 8% as demonstrated by IRR, but this is a project that not only brings economic results but many benefits derived from conservation and preservation of ecosystem services in the long term.

	0	1	2	3	4	5	6	7	8	9	10
	Año 1	Año 2	Año 3	Año 4	Año 5	Año 6	Año 7	Año 8	Año 9	Año 10	Total
Initial investment	($ 760.000)										
Maintenance	($ 19.000)	($ 19.817)	($ 20.669)	($ 21.558)	($ 22.485)	($ 23.452)	($ 24.460)	($ 25.512)	($ 26.609)	($ 27.753)	
Costs to NPV	($ 779.000)	($ 18.015)	($ 17.082)	($ 16.197)	($ 15.357)	($ 14.562)	($ 13.807)	($ 13.092)	($ 12.413)	($ 11.770)	($ 911.295)
Economic Benefit	$ 106.572	$ 111.155	$ 115.934	$ 120.919	$ 126.119	$ 131.542	$ 137.198	$ 143.098	$ 149.251	$ 155.669	
Benefit to NPV	$ 106.572	$ 101.050	$ 95.813	$ 90.849	$ 86.141	$ 81.677	$ 77.445	$ 73.432	$ 69.627	$ 66.019	$ 848.624
NPV (DR=10%)	($ 672.428)	$ 83.034	$ 78.731	$ 74.652	$ 70.783	$ 67.116	$ 63.638	$ 60.340	$ 57.213	$ 54.249	($ 62.671)

Table 24: DR10% component 1

301. The payback graphic shows that the investment will be recovered in approximately 8 years with a discount rate of 3% and in 9 years with a discount rate of 5%.

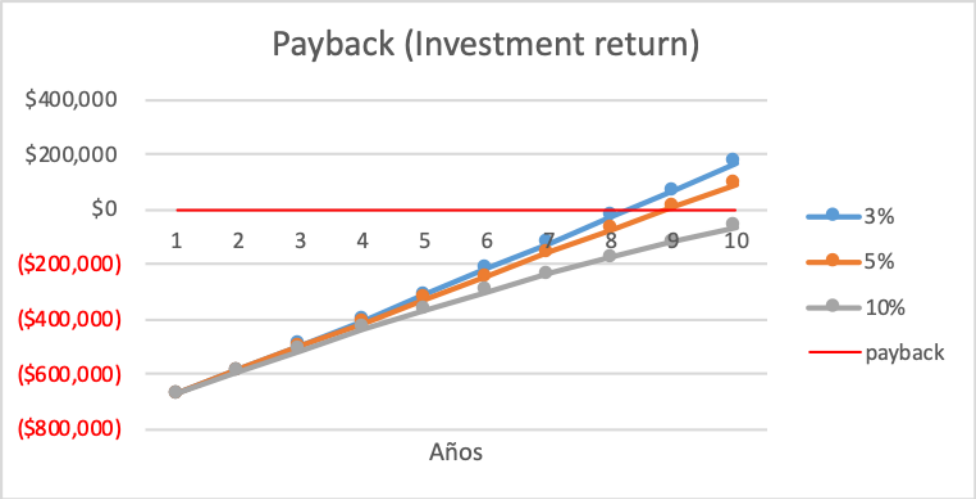


Figure 30. Investment and payback component 1

302. **Figure 31** allows to evidence that the contribution of the project in conservation and improving of management practices, makes conservation and sustainable management measures profitable. The allows farmers to have economic and non-economic benefits in 10 years, by reducing losses to face drought and deforestation, and to take advantage of thepotential increase in yield due to the incorporation of techniques that improve agricultural management and forest preservation.

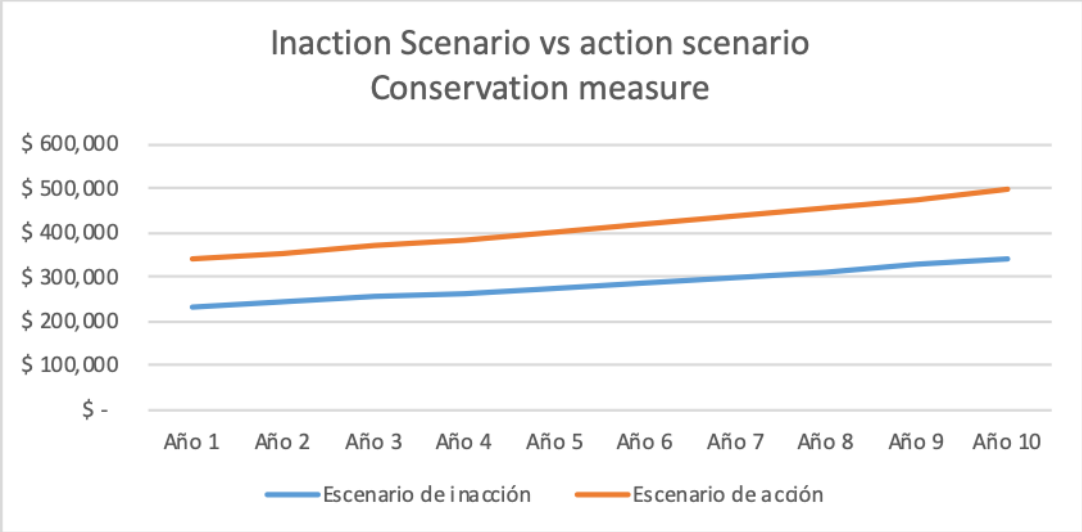


Figure 31. Comparative scenarios component 1

Multicriteria analysis

303. To analyze the measures not only from a quantitative but from a qualitative perspective as well, a multi-criteria analysis was performed. A set of criteria was established with some indicators that will allow comparing which criteria has more weight while implementing the preservation measures. This analysis is performed given that there are several benefits that are not always easy to quantify in monetary terms.

N.	Criteria	Indicators
1	Environmental: Conservation of natural landscapes	# of ha of forest conserved in the Bio-corridor
2	Economic: Reduction in the use of wood	30% of reduction of current use of wood
3	Social: Planning and PDOT	# of Decentralized Governments (GAD) with planning, regulatory and normative instruments for ACUS

Table 3125: Multicriteria analysis component 1

304. A relative weight in a numeric scale is given to each criterion to determine what is more important at the moment of implementing adaptation measures, and at the same time, three benefits were chosen to make a comparison between them.

305. Table 3125 presents thevresult of the multicriteria analysis and shows that the criteria related to the implementation of adaptation measures in at least 2800 families gives a higher weight to the social aspect. The practice of “improving sustainable production alternative to reduce pressure on forests” gives an equal weight to the three criteria meaning that all of them are important for this activity. The third measure, establishment of functional conservation areas as part of the toachi/Pilaton corridor, gives as well a higher weight to the social aspect, highlighting once more the importance of local planning to achieve the expected conservation results to benefit the population of the intervention area. Therefore, the component will bring benefits to the local population, not only in terms of economic benefits from conservation of landscape and from the reduction of wood use, but also in terms of social benefits through improving their capacities to plan and improve their practices with a holistic approach and with a long-term vision.

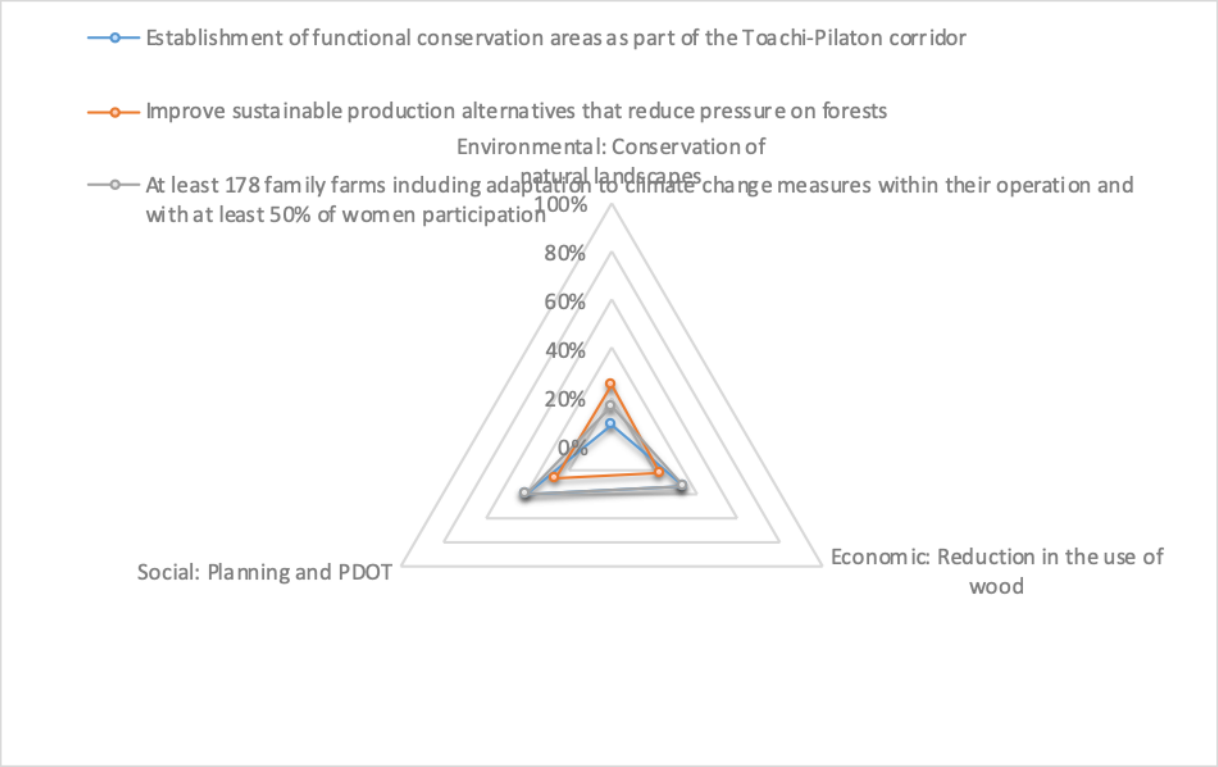


Figure 32. Multicriteria approach component 1

Cost-Benefit Analysis Component 2

306. For the analysis of component 2 a total co-executors of 375 families (families are conformed by 5 or 7 people) has been considered with an average of 1,33 hectares,

a 20% level of drought affectation due to the natural characteristic of the area that presents many slopes and an average inflation of 4.3%.

307. Table 32 presents the identified practices based on the initial analysis executed. The amount of annual maintenance value $7,933 comes from adding the annual individual values of the following measures:

Annual maintenance value of the measure		
1	Family gardens	1,653.00
2	Crop diversification/ agroforestry	774.50
3	Recovery of forests with fruits species	2,285.00
4	Live fences	1,365.00
5	Silvopastoril system	445.50
6	Drip irrigation system	866.00
7	Water reservoir	604.00
	Total	**7,993.00**

Table 262: Imputs cost – benefits component 2
Source: CEDIR (2015) [37], MAGAP [38]

308. The implementation of these measures is expected to diminish the impact of drought and the consequent economic loses to farmers by increasing its crops yielding by 3%. For this analysis, the three principal crops of the area were considered:

Total hectares	500										
Crop	**Hectare**	Percentage	Yield qq/ha	Cycles	Total year production (qq)	Price per qq	Total Value	Value of Real production	Benefit of the measure by reduction of drought impact	Benefit per increase in yielding	Total Benefits
Sugar Cane	250	50%	39.2	1	9800	15.98	$ 156,604	$ 125,283	$ 31,321	$ 3,758	$ 35,079
Corn	150	30%	5.6	1	840	35	$ 29,400	$ 23,520	$ 5,880	$ 706	$ 6,586
naranjilla	100	20%	16	1	1600	45	$ 72,000	$ 57,600	$ 14,400	$ 1,728	$ 16,128
							$ 258,004	**$ 206,403**	**$ 51,601**	**$ 6,192**	**$ 57,793**

Table 273: Cost – benefits component 2
Source and methodology: MAE, 2016[39].

[37] CEDIR. (2015). Guía para la elaboración de planes de mantenimiento y operación de las medidas de adaptación al cambio climático de los proyectos PACC. PNUD; Environment Ministry. Cuenca.
[38] MAGAP/GIZ (2017), Buenas prácticas agrarias para enfrentar el Cambio Climático en Ecuador, Agriculture Ministry/ Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.
[39] Environment Ministry (MAE) y la Cooperación Internacional Alemana (GIZ). 2016. Policy Brief, Manual para la valoración económica de medidas de adaptación y mitigación del cambio Climático en el Ecuador. 8. P. Mafla, S; Chiriboga, M-V; Guzmán, D; Fuertes, F; Albuja, M-V; Arroyo, J-A; Gavilanes, C.

309. The total production of the target area was estimated taking into account the year production cycles and the productivity (quintals per hectare) to finally determine the potential of implementing the adaptation measures..

10 years time horizon	r=3%	r=5%	r=10%
Net present value of benefits	611,883	560,896	460,200
Net present value of costs	(384,626)	(377,574)	(363,648)
Net present value (NPV)	227,257	183,322	96,553
Cost/Benefit relation	1.59	1.49	1.27
Internal return rate (IRR)	18%		

Table 34: Internal return rate (IRR) component 2

The result of the cost-benefit analysis with the aforementioned data shows that the project is profitable for each of the three discount rates analyzed (3%, 5%, 10%), without taking into account the possible increases in yield or co-benefits in other areas of agriculture such as cattle ranching. At the same time, the measures implemented help to reduce the hours of work invested by farmers in collecting water and in implementing inefficient low-yielding practices. This last point is a non-monetary benefit that could increase the life quality of local farmers.The following 35, shows that the initial investment will have a return of $611.883, from which we rest $384.626 from maintenance cost, resulting a NPV of 227.257, which shows that the project is profitable under the rate of discount 3%. The internal return rate is 18%, which is very reasonable number.

	0	1	2	3	4	5	6	7	8	9	10
	Año 1	Año 2	Año 3	Año 4	Año 5	Año 6	Año 7	Año 8	Año 9	Año 10	Total
Inversión inicial	($ 300.000)										
Mantenimiento	$ (7.993,00)	($ 8.337)	($ 8.695)	($ 9.069)	($ 9.459)	($ 9.866)	($ 10.290)	($ 10.732)	($ 11.194)	($ 11.675)	
Costos a VPN	($ 307.993)	($ 8.094)	($ 8.196)	($ 8.299)	($ 8.404)	($ 8.510)	($ 8.618)	($ 8.726)	($ 8.837)	($ 8.948)	($ 384.626)
Beneficios económi	$ 57.793	$ 60.278	$ 62.870	$ 65.573	$ 68.393	$ 71.334	$ 74.401	$ 77.601	$ 80.937	$ 84.413	
Beneficios a VPN	$ 57.793	$ 58.522	$ 59.261	$ 60.009	$ 60.766	$ 61.533	$ 62.310	$ 63.096	$ 63.893	$ 64.699	$ 611.883
VPN (TD=3%)	($ 250.200)	$ 50.428	$ 51.065	$ 51.709	$ 52.362	$ 53.023	$ 53.692	$ 54.370	$ 55.056	$ 55.751	$ 227.257

Table 285: DR3% component 2

310. Table 296 shows that the initial investment will have a return of $560.896, from which we rest $377.574 from maintenance cost, resulting a NPV of 183.322, which shows that the project is profitable under the rate of discount 5%.

	0	1	2	3	4	5	6	7	8	9	10
	Año 1	Año 2	Año 3	Año 4	Año 5	Año 6	Año 7	Año 8	Año 9	Año 10	Total
Inversión inicial	($ 300.000)										
Mantenimiento	($ 7.993)	($ 8.337)	($ 8.695)	($ 9.069)	($ 9.459)	($ 9.866)	($ 10.290)	($ 10.732)	($ 11.194)	($ 11.675)	
Costos a VPN	**($ 307.993)**	**($ 7.940)**	**($ 7.887)**	**($ 7.834)**	**($ 7.782)**	**($ 7.730)**	**($ 7.679)**	**($ 7.627)**	**($ 7.577)**	**($ 7.526)**	**($ 377.574)**
Beneficios económi	$ 57.793	$ 60.278	$ 62.870	$ 65.573	$ 68.393	$ 71.334	$ 74.401	$ 77.601	$ 80.937	$ 84.418	
Beneficios a VPN	**$ 57.793**	**$ 57.408**	**$ 57.025**	**$ 56.645**	**$ 56.267**	**$ 55.892**	**$ 55.519**	**$ 55.149**	**$ 54.782**	**$ 54.416**	**$ 560.896**
VPN (TD=5%)	**($ 250.200)**	**$ 49.468**	**$ 49.138**	**$ 48.811**	**$ 48.485**	**$ 48.162**	**$ 47.841**	**$ 47.522**	**$ 47.205**	**$ 46.890**	**$ 183.322**

Table 296: DR5% component 2

311. Table 7 shows that the initial investment will have a return of $460.200, from which we rest $363648 from maintenance cost, resulting a NPV of 96.553, which shows that the project is profitable under the rate of discount 10%.

	0	1	2	3	4	5	6	7	8	9	10
	Año 1	Año 2	Año 3	Año 4	Año 5	Año 6	Año 7	Año 8	Año 9	Año 10	Total
Inversión inicial	($ 300.000)										
Mantenimiento	($ 7.993)	($ 8.337)	($ 8.695)	($ 9.069)	($ 9.459)	($ 9.866)	($ 10.290)	($ 10.732)	($ 11.194)	($ 11.675)	
Costos a VPN	**($ 307.993)**	**($ 7.579)**	**($ 7.186)**	**($ 6.814)**	**($ 6.461)**	**($ 6.126)**	**($ 5.808)**	**($ 5.507)**	**($ 5.222)**	**($ 4.951)**	**($ 363.648)**
Beneficios económi	$ 57.793	$ 60.278	$ 62.870	$ 65.573	$ 68.393	$ 71.334	$ 74.401	$ 77.601	$ 80.937	$ 84.418	
Beneficios a VPN	**$ 57.793**	**$ 54.798**	**$ 51.959**	**$ 49.266**	**$ 46.713**	**$ 44.293**	**$ 41.998**	**$ 39.821**	**$ 37.758**	**$ 35.801**	**$ 460.200**
VPN (TD=10%)	**($ 250.200)**	**$ 47.219**	**$ 44.773**	**$ 42.453**	**$ 40.253**	**$ 38.167**	**$ 36.189**	**$ 34.314**	**$ 32.536**	**$ 30.850**	**$ 96.553**

Table 37: DR5% component 2

312. The payback graphic shows that the investment will be recovered in 6 years with a discount rate of 3 and 5%, and in seven years with a discount rate of 10%.

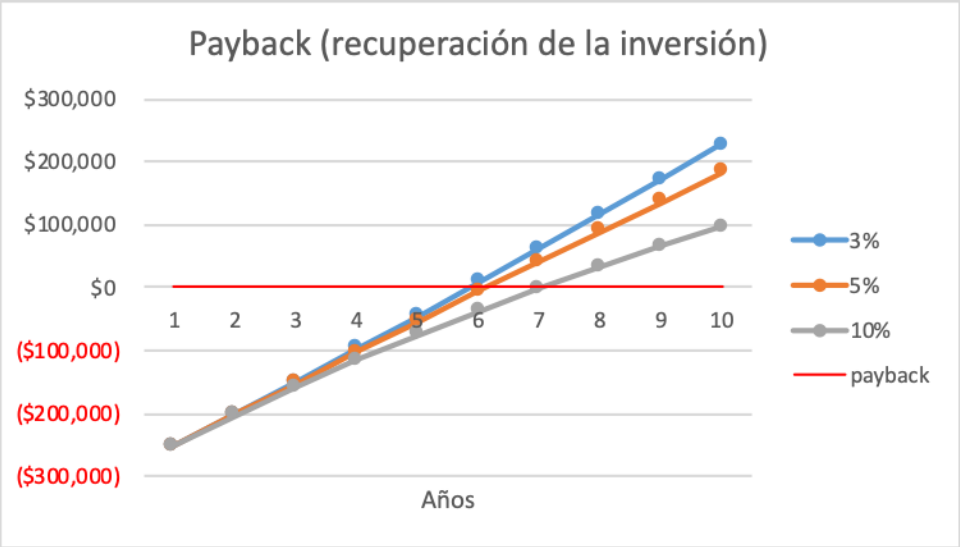


Figure 33. Investment and payback component 2

313. **Figure 34** of inaction vs. action allows to evidence that the contribution of the project in agricultural crops makes adaptation measures profitable as it allows farmers to have economic benefits in 10 years, by diminishing the risk of losses when taking measures to face of drought and inefficiency, and the potential increase in yield due to the incorporation of techniques that improve agricultural and irrigation management.

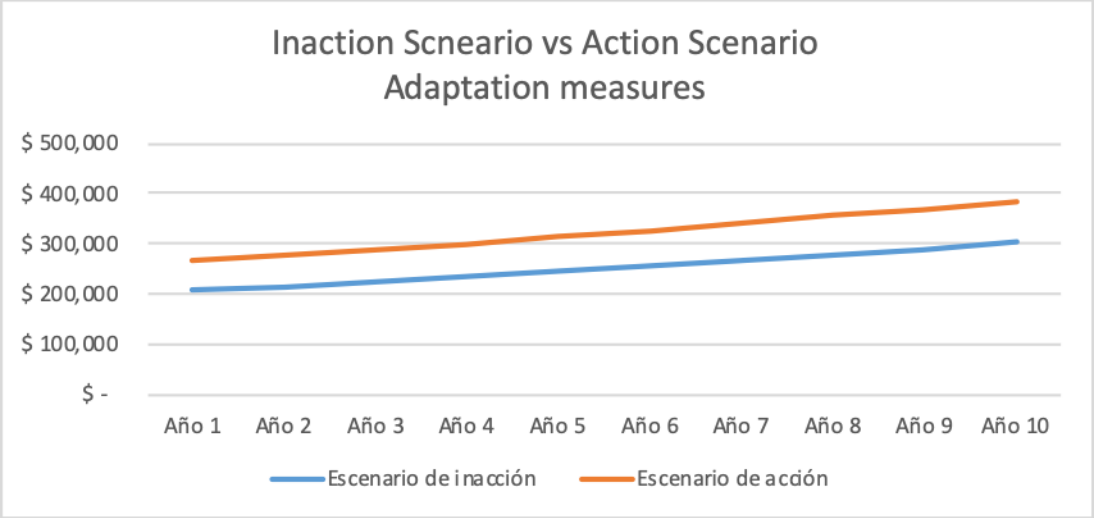


Figure 34. Comparative scenarios component 2

Multicriteria analysis

314. To analyze the measures not only from a quantitative but from a qualitative perspective as well, a multi-criteria analysis was performed. A set of criteria was established with some indicators that will allow comparing which criteria has more weight while implementing adaptation measures.

	Criteria	Indicators
1	Sustainability of the resources	Number of adaptation measures implemented focused on improving agricultural management
2	Increase in productivity	Product yield per unit area
3	Finance and social intelligence and planning	Number of people who have received reimbursable and non-reimbursable funds to implement measures based on their planning.

Table 308: Multicriteria analysis component 2

315. A relative weight in a numeric scale is given to each criterion to determine what is most important at the moment of implementing adaptation measures, and at the same time, three adaptation measures were chosen to make a comparison between them.

316. Figure 35 shows that the main criterion for the implementation of an adaptation measures is sustainability in the use of resources, since the adaptation measures will allow improving agricultural practices to use resources efficiently and sustainably, seeking their long-term preservation. The result of improving practices leads us to the second priority criterion, which is the increase in productivity, since the improvement in farmers' income is directly related to the improvement in their quality of life. Finally, the criterion of intelligence and financial and social planning, since the implementation of measures must always be complemented by an adequate planning that allows its successful implementation and access to economic resources.The graphic shows that the measure of irrigation systems has a higher influence in increasing productivity, the measure related to incentives to reduce pressure on forest and finally the sustainable productive practices have the same tendency but in less intensity.

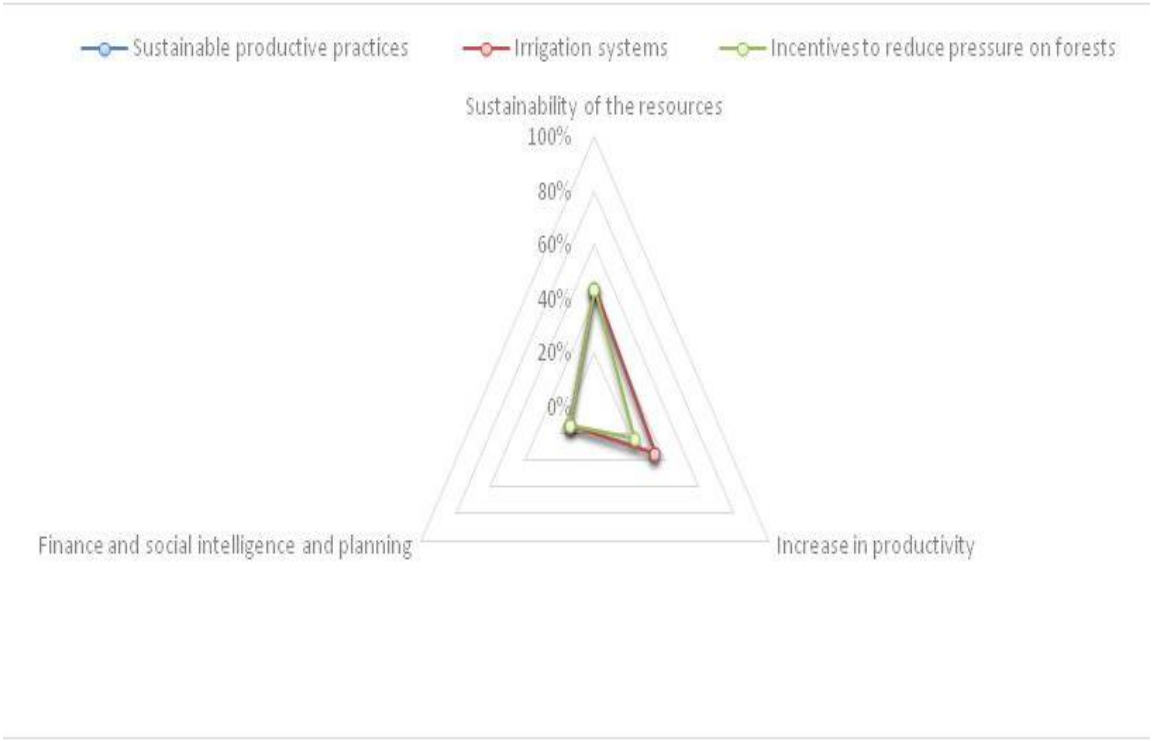


Figure 35. Multicriteria approach component 2

317. As previously mentioned, iproject area the main economic activity is the production of sugar cane and its artisanal transformation to “panela”, using wood as source of energy. Due to the importance of this activity, it is foreseen a meaure to promote technological change In order to improve ovens and cooking systems. This measure does not intend to expand sugar cane surface but to provide a more sustainable management to the crop, and to improve the efficiency of the transformation process

318. The ovens will be built with a chimney that will contribute to increase the concentration and storage of heat. The chimney will be made of brick with specific technical dimensions and will include two or more metallic stainless steel pan for cooking the sugar cane juice. Previous experiences from implementing this measure, demonstrates that before the measure 1/2m^3 of wood are required to cook 580 liters of juice;after the construction of the ovens only 1/6m^3 of wood was needed, representing a diminish of 60% in the use of wood. The estimated cost of implementation of an oven is of $20.000, plus $400 in hand labor for its construction[40].

319. This measure presents several benefits, first economic because the transformation of the product gives an added value to it, allowing families to increase their economic incomes. Second benefits in terms of improving their life quality for having more free time to dedicate to other productive activities. Third, environmental benefitis with the

[40] MAGAP/GIZ (2017), p. 33, 34.

contribution to climate change mitigation by reducing deforestation and the pressure on forests.

320. Additionally, the project implementation will seek the supporting of the MEbA methodology and experiences. Considering, the MEbA project has so far implemented almost 10,000 EbA measures (for a total financing of over USD 12 million, exclusively provided by the microfinance institutions' own funds and paid by the farmers) in cooperation with 5 microfinance institutions in Colombia and Peru and is assessing the implementation of its solutions in Ecuador. The MEbA project is funded by the German Federal Ministry of Environment via its International Climate Initiative.

321. All proposed EbA options have clear and measurable benefits for the health of ecosystems and the services they provide. Additional scientific data gathering will form part of the project. Its purpose is twofold:

    - First, to obtain (i.e., farm-level) data that can be leveraged to drive individual cost-benefit analysis for a given intervention. As per the nature of the benefits involved (monetizable as well as non-monetizable), this cost-effectiveness analysis will use either a Multi-Criteria or a Cost-Efficiency approach.
    - Second, low-level data will enable periodic reviews for Monitoring and Evaluation to support the still limited availability of academic studies on the actual impact of EbA.

322. Local and regional service providers (e.g. financial institutions) will be leveraged to collect this data.

323. The proposed mechanism for intervention, channeling funds to local farmers through the local finantial institutions networks and an investment fund (see also sections Component 2), will also be instrumental in achieving cost-efficient results. The underlying principle of incorporating the entire farmer community (as opposed to only a sub-segment) according to its level of vulnerability will assure a broader impact. Creating different products for farmers with and without acces to inputs and financing is a necessary precondition of this approach. The former need a stronger focus on subsidized components, while the previous can afford to take on more of the intervention cost in form of a credit.

324. Careful incentive design will be in place to assure that the more vulnerable groups can be brought into the market as far as possible. By aligning incentives with long-term support through the proposed investment fund, cost-effectiveness will be higher than in comparable projects with a stronger focus on subsidies.

325. After performing the cost benefit analysis, a comparison of the internal rate is made in 6 different management scenarios: SENPLADES Ecuadorian project, 10% bank interest rate in Ecuador, 8.68% fixed term of the Bank, 4.28% Ecuador Climate Change and Water Project (PACC), 7.22% FORECCSA Agriculture and Adaptation

Project, 26% Livestock Project (Ecobona Ecuador), the project selection were focusing adaptation climate change initiatives.

Summary of scenarios

Internal Return Rate (TIR)	**Ecuadorian Project SENPLADES** **10%**	**Ecuadorian bank interest rate[41]** **8.68%**	**Bank fixed term** **4,28%**	**Climate change and water project Ecuador (PACC) [42]** **7,22%**	**Agriculture and Adaptation Project FORECCSA[43]** **26%**	**Livestock project (Ecobona Ecuador)[44]** **14,29%**
C1 Conserve vegetation cover 5%	5%	5%	5%	5%	5%	5%
C2 Adapt farming practices to new climate change conditions 18%	18%	18%	18%	18%	18%	18%
Average Project	**11.5%**	**11.5%**	**11.5%**	**11.5%**	**11.5%**	**11.5%**

Table 39 : Summary of scenarios

D. Describe how the project is consistent with national or sub-national sustainable development strategies.

326. One of Ecuador's advantages in relation to climate change is the articulation of public policies at all levels.

The project is aligned with current national environmental regulations. The *Constitution of the Republic of Ecuador* (2008) contains two articles, 413 and 414, related to climate change management in the country. Article 414 establishes that "the state will adopt appropriate measures to mitigate climate change, by limiting greenhouse gases emissions from, deforestation and atmospheric pollution; also that it will take measures for the conservation of forests and vegetation and will protect the population at risk." In addition, the Constitution recognizes the need to "manage land use planning inwatersheds and encourage the creation of watershed councils, in accordance with the law."

327. The *Constitution of the Republic of Ecuador* (20th October 2008) contains a number of important provisions of relevance to this project:

- Right of the population to live in a healthy environment Art. 14, 66.

[41] https://www.bce.fin.ec/index.php/component/k2/item/148-tasas-de-inter%C3%A9s
[42] http://www.ambiente.gob.ec/proyecto-pacc/
[43] http://suia.ambiente.gob.ec/proyecto-foreccsa
[44] Thesis Livestock project pg 132, available: http://www.dspace.uce.edu.ec/bitstream/25000/1974/1/T-UCE-0005-351.pdf

- Recognition of water access as a Human Right: All citizens have the right to have safe water in sufficient quantity and quality. Articles 3, 12, 15, 32, 318, 396 and 413.
- Considers water as a strategic resource: It is the support of food sovereignty and sustainable development of the country. Articles 12, 14, 71, 72, 73, 74, 397, and 411.
- Considers water as the right of nature and source of life. Articles 281 and 282.

  Finally, it recognizes water as a heritage resource: Water cannot be privatized since it is part of the national heritage considered strategic for the development of the country and for public use. Articles 85, 95, 318, 319 and 419.

  In addition, the constitution is an institutional umbrella under which safeguards are addressed and respected. It provides a context for the implementation of a rights-based approach associated with REDD+ and UNFCCC safeguards, and incorporates environmental criteria into production activities, ecosystem management, citizen participation in environmental discussions and climate change adaptation (Policies 2, 3 and 5).

328. The *National Development Plan,* (named during the present period of the Government **"***Toda una vida"2017-2021*) establishes policies and strategic guidelines related to climate change, such as:

- Objective 3: Guarantee the rights of nature for current and future generations. Policy 3.3: Promote good environmental practices that contribute to the reduction of pollution, to conservation, to mitigation and adaptation to the effects of climate change. In addition, to reduce the Vulnerability Index from high to medium among the, population, livelihoods and ecosystems.
- Objective 5: Promoting productivity and competitiveness for sustainable economic growth in a redistributive and solidarity way indicates that the rural population must strengthen the capacities of social interaction that strengthens cooperation and collaborative networks as well as the resistance capacities, which respond to adverse scenarios caused by natural effects and climate change. This objective also recommends to implement territorial guidelines for territorial cohesion with environmental sustainability and risk management; habitat management for sustainability, environmental and integral risks management;p integral and co-responsible management of water heritage to protect its quality, availability and proper use, with recovery actions, conservation and protection of water sources, recharge zones, aquifers and groundwater, considering the equitable access of water for consumption, irrigation and production.Objective 7 states that climate change is a multi-sector problem of national scope that should be approached with programmatic actions which generate results in the short and medium term. Specific objective 7.10 focus on implementing measures to mitigate and adapt to climate change to reduce the economic and environmental vulnerability with

emphasis on priority groups. In addition, specific objective 7.6 focus on managing water resources in a sustainable and participatory manner, with a focus on watersheds and ecological flows to ensure the human right to water.

329. The *Ministry of the Environment of Ecuador* also considers a specific policy for the management of climate change its "Policy 3: Management of adaptation and mitigation to climate change to reduce social, economic and environmental vulnerability".

330. The *National Law on Water Resources, Uses and Exploitation 2014 (Water Law),* aims to develop the human right to water, as well as to regulatethe authorization, management, preservation, conservation and use of water, within the national territory in its different phases, forms and physical states.. In this sense, the management through hydrographic basins is regulated:

- Articles 2, 7 and 17, recognize the strategic nature of water, the participatory and community nature of its management, as well as the consideration of ecological flows in all forms of use and exploitation to achieve sustainable development.
- Articles 12 and 65, recognize that the protection and conservation of sources is the responsibility of the State, the Water Authority, the decentralized autonomous governments, water users, communities, people, nationalitiesand property owners, where water sources are located.They will be responsible for the sustainable and integrated management, as well as for the protection and conservation of water sources..
- Article 64, propose strategies for the conservation of catchment areas, regulation, recharge, outcrop and natural water channels, in particular, snow-capped mountains, glaciers, páramos, wetlands and mangroves.
- Article 83, promotes the adoption and promotion of measures regarding adaptation and mitigation to climate change to protect the population at risk, the development of mechanisms to encourage the efficient use of water through appropriate technologies in irrigation systems

331. The project is in line with the *National Climate Change Strategy* (MAE, 2012), in particular with specific objectives 2 and 4.

- Specific objective 2. The performance levels of the productive and strategic sectors and the country's infrastructure are not affected by the effects of climate change:
    - Action 1. Strengthen and consolidate the development of projects in the productive, strategic and infrastructure sectors with criteria of adaptation to climate change.

        - Action 2. Consolidate actions that increase the resilience of the infrastructure in the face of extreme climate events.
- Specific objective 4. To manage the water heritage with a comprehensive and integrated approach to guarantee the availability, sustainable use and quality of the water resource for human and natural uses:
    - Action 1. Consolidate the integral management of the water heritage, ensuring its availability, sustainable use and quality for the human and natural use in the face of the impacts of climate change.
- Specific objective 5. Conserve and sustainably manage the natural heritage and its terrestrial and marine ecosystems in order to contribute with its capacity to respond to the impacts of climate change:
    - Action 1. Consolidate and strengthen the implementation of measures that increase the capacity of species and ecosystems to respond to the impacts of climate change.
    - Action 2. Ensure that the Heritage of Natural Areas contributes to the response capacity of species and ecosystems in the face of the impacts of climate change
- Specific objective 6. Take measures to ensure access of priority attention groups to the resources for climate change response:
    - Action 1. Promote timely access to health, nutrition and infrastructure resources for the population, especially for vulnerable and priority attention groups, which contribute to the response capacity
- Specific objective 8. Implement measures to increase the response capacity of human settlements to deal with the impacts of climate change. Within this objective::
    - Action 2. Promote public participation and social organization to facilitate the implementation of response measures to face extreme climate events
    - Action 3. Promote the generation and access to information on possible impacts of extreme events under climate change scenarios.

332. The *Organic Code of the Environment* (COA) is an advanced lawwhich recognizes nature as subject of rights. The COA deals with the ownership and possession of community lands within the National System of Protected Areas. It contains provisions on: (i) the conservation, use and sustainable management of biodiversity and natural resources; (ii) the protection, maintenance and development of collective knowledge associated with biodiversity; and (iii) of the practical knowledge, ancestral and cultural traditions contemplated in the 282 articles of the COA.

333. Finally, the international instruments with which the proposal isrelated:

    - Kyoto Protocol on climate change
    - International Convention for the Elimination of All Forms of Racial Discrimination

- Convention for the Protection and Promotion of Diverse Cultural Expressions
- Convention for the Elimination of Discrimination against Women
- Convention for Biological Diversity
- Convention to Safeguard Intangible Cultural Heritage
- United Nations Macro Convention on Climate Change - Decision 1 / CP.16
- Convention on Biological Diversity - Decision XI / 19

E. 1. Describe how the project meets relevant national technical standards and complies with the Environmental and Social Policy of the Adaptation Fund.

334. The Ministry of Environment (MAE) is the national institution in charge of developing environmental policy and coordinating strategies, projects and programmes aimed at ecosystem conservation and the sustainable use of natural resources. The MAE defines the rules regarding adequate environmental quality and development based on the conservation and appropriate use of biodiversity and natural resources

335. The project intervention will comply with the environmental regulatory framework established by the *Environmental Management Law* (Law 37 of 1999, coded in 2004), the *environmental impact evaluation* system (Executive Decree 061 of 2015), the *Forestry and Conservation of Natural Areas and Wildlife law* (Law 2004-017 coded in 2004) and complementary regulations.

336. The project will take advantage of the recently adopted Organic Law on Rural Land and Ancestral Territories (signed on March 2016) which establishes that rural lands must serve to social and environmental functions (articles 11 and 12). The social function refers to be productive and the environmental function refers to the implementation of sustainable practices toconserve key habitats. Some relevant provision are presented as follows

- The law recognises that private or communal rural land fulfils the environmental function when is dedicated to conservation of renewable natural resources, including forest protection and production, conservation incentives (e.g., Socio Bosque), ecotourism and recreation. There will be incentives to those who fulfil the social and environmental functions.The law states that rural state land cannot be claimed by possessors or invaders (article 18) which this opens a line of action to solve certain land-tenure issues.
- The law forbids the expansion of the agriculture frontier into fragile and threatened ecosystems (article 50), including cloud forests. However existing subsistence agriculture activities will be respected.

337. Concerning the national technical standards, the project has relation with several local laws, the process for evaluating the national standard consist in the following 4 steps, as shown below:

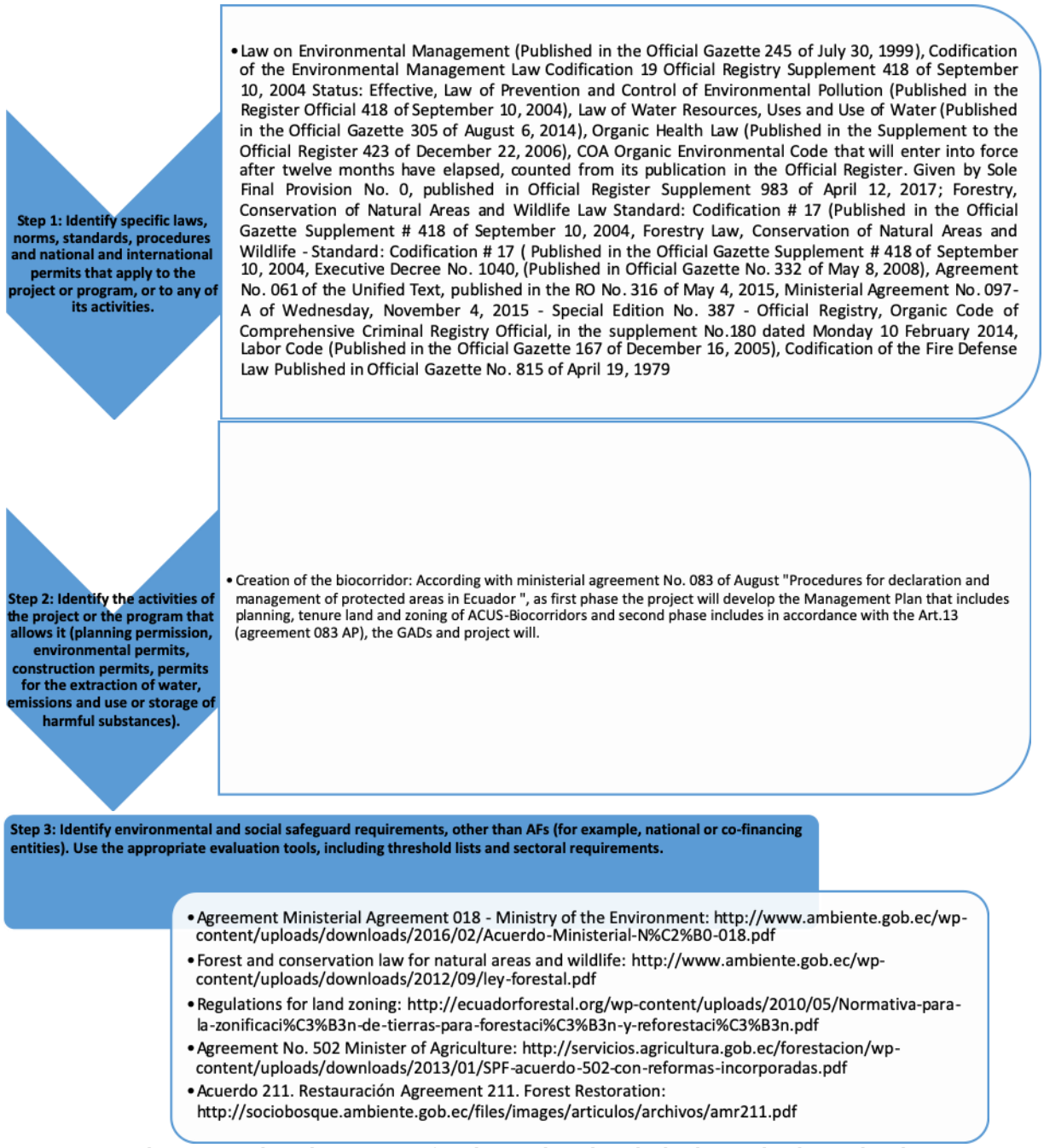


Figure 36. First three steps for the National technical standards evaluation

The technical standards that will be applied in the project are those that are in step 4 (**Figure 37**).

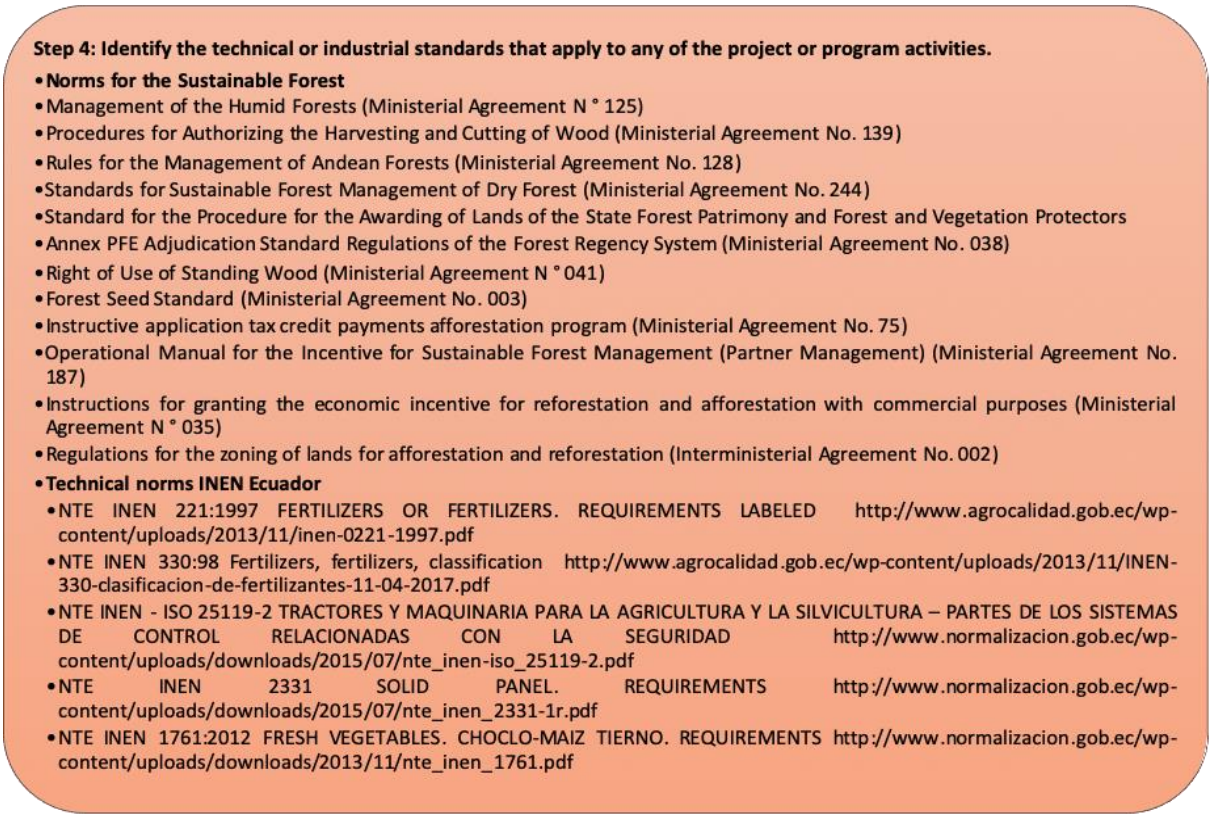


Figure 37. Step four for the National technical standards evaluation

E. 2. Describe how the project complies with the Environmental and Social Policy of the Adaptation Fund.

338. All project interventions will comply with the AF Environmental and Social Policy. A screening of risks was completed during project formulation and a set of measures were designed to ensure that the project will not exacerbate inequalities, harm the environment, causing negative impacts to marginalized or vulnerable groups. Annex 7 presents the screening matrix and the environmental and social management plan (section III C of Annex 7).

339. Consultations with the Ministry of Environment, as well as, local governments, co-executors and the community took place during the project design phase and will continue at all stages of the project. This is to ensure that all unidentified sub-

projects (USP) and activities comply with the relevant technical standards and environmental and social principles. Workshops were carried out to share the project concept and exchange experiences. These workshops were crucial for finalize the project design. (**Error! Reference source not found.** and **Error! Reference source not found.**).

F. Describe if there is duplication of project with other funding sources.

340. No duplication with other funding sources was found. On the contrary, the project will have synergies with a number of initiatives.

341. The project will complement the Socio Bosque Programme, by promoting with local partners the development of long-term mechanisms to provide conservation incentives to local landowners.

342. The project will use the results of the following projects:

- *Enhancing Resilience of Communities to the Adverse Effects of Climate Change on Food Security* (FORECCSA). This project is funded by the Adaptation Fund (AF) with support of the World Food Programme asthe implementing agency. The project partners are the Ministry of the Environment - MAE, the Ministry of Agriculture and Livestock- MAG, the Jubones River Basin Public Consortium, and the Provincial Government of Pichincha. The present project will use the experience and lessons on mainstreaming gender in rural communities for food security and adaptation to climate change.
- *Adaptation to Climate Change through Effective Water Governance* (PACC). This is a GEF funder project (GEF ID 2931) executed by MAE with support of UNDP as the GEF implementing agency. It does not cover the present area of intervention, but its lessons will be useful to mainstreaming water climate risk in local planning and application of water saving measures by farmers.
- *Analysis of the vulnerability of flagship hydropower plants to the effects of climate change* (CHECC), in particular the results for the Toachi-Pilatón hydropower plant. The present project is using the results of the watershed vulnerability analyses.
- *Third National Communication* (3NC) and *First Biennial Update Report* (BUR). This is a GEF funded project (GEF ID 5478) implemented in Ecuador. The executing agency was MAE, and the GEF implementing agency is UNDP. The project objective is to prepare the third national communication on climate change and the first biennial update report. The present project will use the results of 3NC, in particular the outcomes of the climate change models and the guidelines for climate change adaptation.

343. The present project will aim for collaboration and synergies with HIDROTOAPI´s in the framework of its Environmental Management Plan (EMP) which focus on those communities located in the direct area of influence of the hydropower plant. Actions include strengthening the provision of basic services, education, health and production development. The last element includes improving livestock and agriculture management, promoting tourism microenterprises, and afforestation and reforestation.

344. The following table summarizes relevant indicatives in relationship between climate change and territory following table and figure:

Initiative	Sponsor	Objective	Intervention zone	Outputs	Synergy
Enhancing Resilience of Communities to the Adverse Effects of Climate Change on Food Security (FORECCSA). 2017	Funded by the Adaptation Fund (AF), the implementing agency is the World Food Programme	Adapting to climate change and ensuring food security in the highlands of Ecuador	Jubones River Basin in Loja and Azuay provinces(33 parishes); Pichincha province in Cayambe and Pedro Moncayo cantons	Vulnerability assessment methodology with emphasis on food security and climate change in the Pichincha province and Jubones River basin 2014.	Vulnerability assessment tools, adaptation measures experiences in others territories
Adaptation to Climate Change through Effective Water Governance (PACC) 2015	Funded by the Global Environmen Facility (GEF), the implementing agency is UNDP	Reduce vulnerability to climate change through effective water resource management	Watersheds of Paute, Jubones, Catamayo, Chone, Portoviejo and Babahoyo	Vulnerability to climate risks in the water sector, rivers Paute, Jubones, Catamayo, Chone, Portoviejo and Babahoyo. Risk to droughts, frosts and other impacts of climate change that may affect the agricultural sector in Ecuador.	Publications and experiences in adaptation measures
Analysis of the vulnerability of flagship hydropower plants to the effects of climate change (CHECC), Currently	Public ecuadorian funds	Analyze the vulnerability to climate change of hydroelectric plants and propose measures at the level of watersheds that can be adopted to minimize the impacts of global warming on energy supply	Ecuadorian Hydroelectric, includes Toachi Pilaton watersheds	Analysis of the vulnerability of flagship hydropower plants to the effects of climate change (CHECC), in particular the results for the Toachi-Pilatón hydropower plant	Both projects CHECC and AF share the same territory, and the current initiative is based in the vulnerability information of CHECC project
The Adaptation to the Impact of Rapid glacier Retreat in the Tropical Andes (PRAA), through the Andean Community of Nations (CAN)	Funded by the Global Environment Facility (GEF),	Strengthen the resilience of ecosystems and local economies to the impacts of the glacial retreat of the tropical Andes	Napo province	Vulnerability and Adaptation Measures to Climate Change in Antisana, Quijos, Jeringa, and Papallacta Rivers.	Vulnerability assessment tools and adaptation measures experiences
Socio Bosque Programme Currently	Public ecuadorian funds	financial incentives to individual and community landowners who voluntarily commit to conserve native forests for a 20-year period	In the river Blanco basin cover 10959,83 ha with 93 co-executors	Conservation areas in the zone of intervention. Methodology and mechanism to forest conservations	Territory and Mechanism to forest protection based in Payments for Environment Services.
Sustainable Development of the Ecuadorian Amazon: integrated management of multiple use landscapes and high value conservation forests, Currently	Funded by the Global Environment Facility (GEF), the implementing agency is UNDP	Catalyze the transformation of land use planning and management in the Ecuadorian Amazon (CTEA) by building a governance and sustainable production framework based on a landscape approach	Provinces: Orellana, Morona Santiago, Sucumbíos, Zamora Chinchipe	In execution from 2018 to 2022	Adaptation to climate change in territories different to the currently initiative. However, the methodology to implement adaptation measures and experiences are similar

Priming Financial and Land-Use Planning Instruments to Reduce Emissions from Deforestation, Currently	Funded by the Green Climate Fund (GCF), the implementing agency is UNDP	Investment to control agricultural expansion into forest areas; optimize existing financial, economic mechanisms to Implement agricultural and livestock production practices that reduce deforestation;	North Amazonia, Middle Amazonia Centro, and South Amazonia that includes Bosques Secos in Loja Province	In execution from 2018 to 2022	Currently investments to control agricultural expansion into forest areas.
Promotion of climate-smart livestock management integrating reversion of land degradation. Currently	Funded by the Global Environment Facility (GEF), the implementing agency is FAO	To reduce soil degradation, increase adaptive capacity to climate change, and mitigate GHG emissions by implementing cross-sectorial policies and Climate-smart livestock management.	Provinces: Loja, Manabí, Guayas, Santa Elena, Imbabura, Napo, Morona Santiago.	Social, environmental and economics vulnerability in seven provinces in Ecuador	Currently sustainable livestock production

Table 40: Initiatives portfolio with relations to climate change

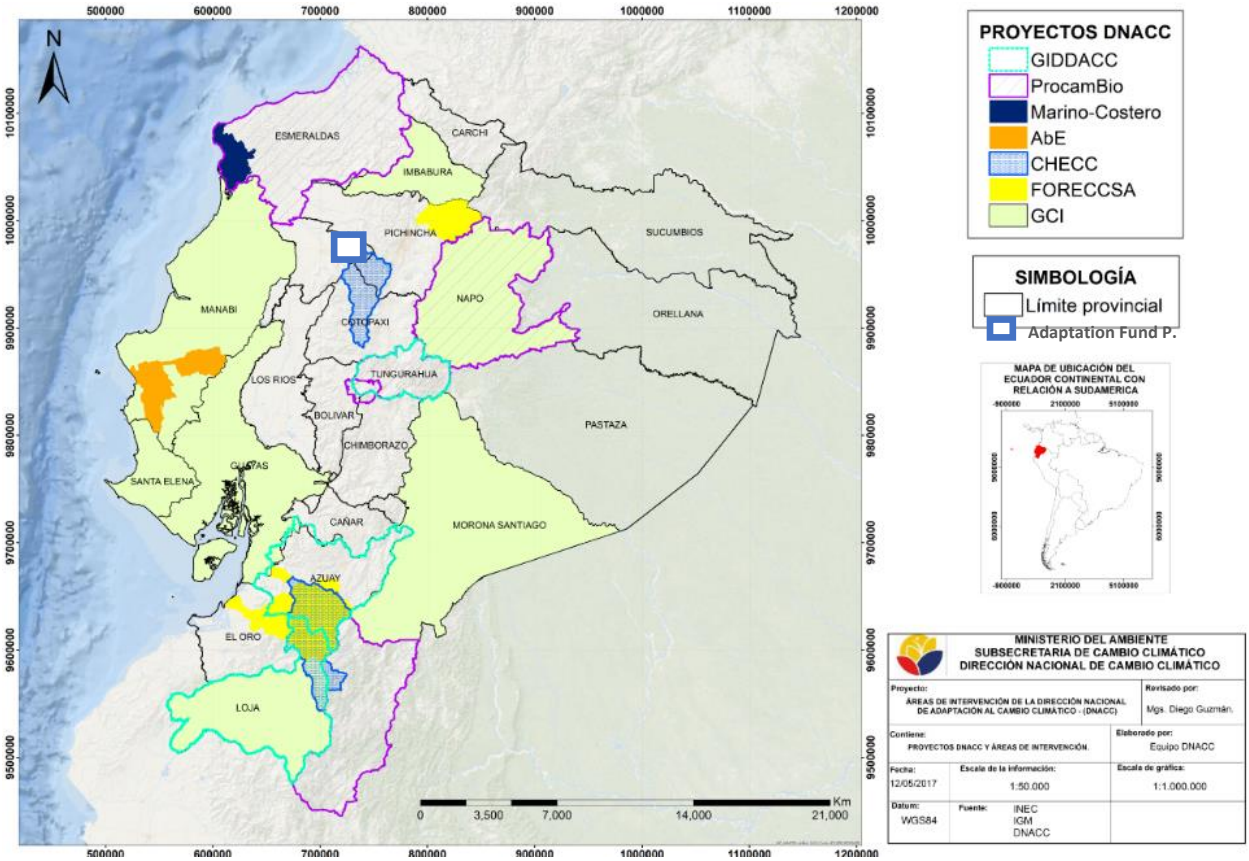


Figure 38. Adaptation climate change initiatives 2018

G. Describe the learning and knowledge management component to capture and disseminate lessons learned.

345. The project has embedded local vision activities into its. Because of this, activities in the component 3 will foster local exchanges and cross learning, systematization, taylor-made product development and the understanding of opportunities for replication and up-scaling. Component 3 of the project focus on learning and knowledge management. It comprises one outcome (i.e., outcome 3) and four outputs (i.e., outputs 6, 7, 8 and 9).
    Durign the implementation phase, a communication and education plan will be developed with the following objectives: (i) raise public awareness and engagement, (ii) facilitate communication and collaboration among stakeholders and project partners, and (iii) enable dissemination of information and lessons learned through taylor-made communicational products.
346. The project team will systematically document and record the advances, best practices, challenges and lessons learned which would derive in recommendations for future outscaling. A monthly electronic information bulletin will be prepared and disseminated to inform the stakeholders and interest groups. In addition, it is envisioned to produce communicational material and documents like infographics of good practices and procedures to be used by local communities and stakeholders and policy briefs to provide recommendations to policy makers at different levels.

347. For the communication at community level, mass media such as radial wedges will be developed to disseminate awareness messages and promote project activities. In addition, the project intends to produce infographics to promote the adoption of adaptation practices.

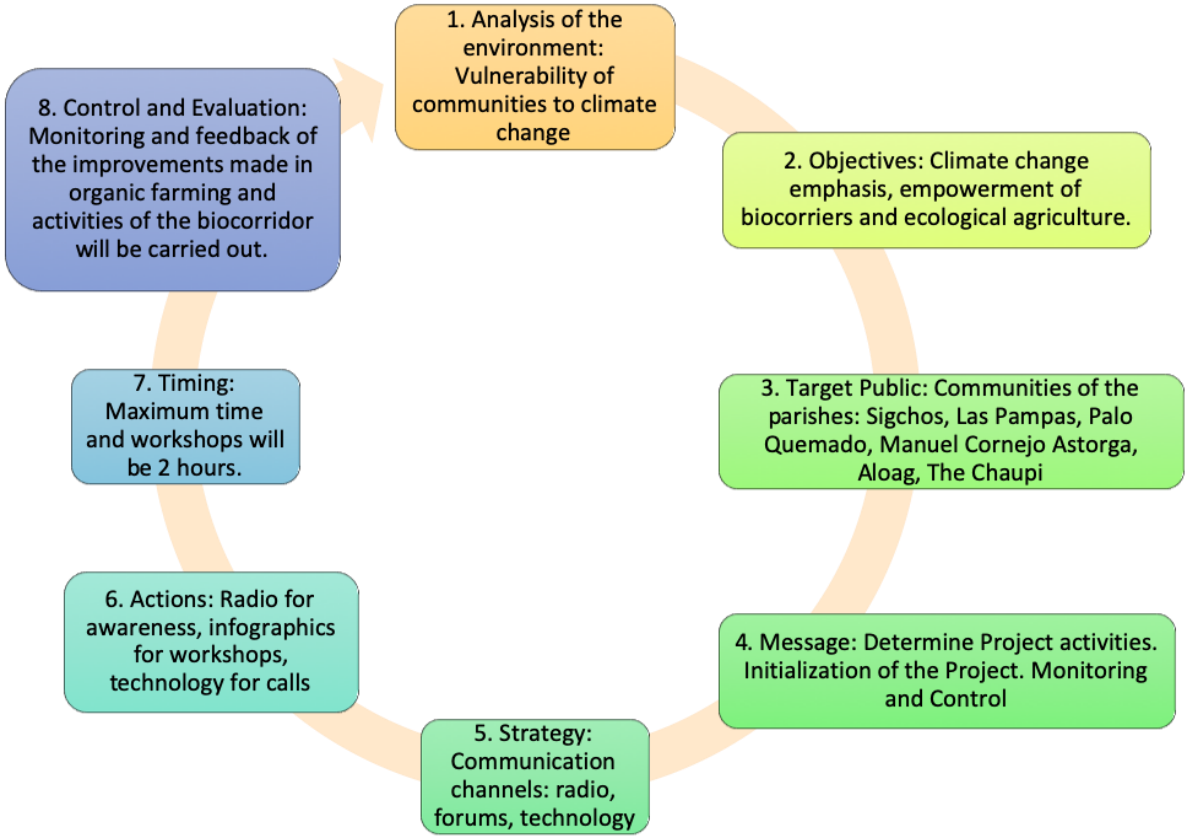


Figure 39. Communication plan

348. The project will disseminate information and results through MAE´s website and the social networks. MAE´s policy is to upload all the information through the Unique System of Environmenta Information (SUIA, for its acronym in Spanish). MAE´s communications office will ensure that information will be distributed to local and national media to reach a wider audience.

349. The following table presents some knowledge management initiatives in selected outputs:

Component 1: Component 1: At least 230,000 ha of native vegetation is conserved to reduce the impact of climate change on the hydrological cycle under integrated watershed management	
Outputs	**Learning and knowledge management**
1.000 ha of native vegetation is conserved by sustainable forest management and conservation mechanisms	This output intends to use participative approaches to capturebest practices during the implementation process and sharing them for the benefit of all. It will take advage of community participation with a gender approach. Infographics and printed material will be developed for to train farmers and land-owners.

Six development plans of local parishes incorporate measures for ecosystem-based adaptation to climate change.	Territorial Land Use Plans (TLUP) that incorporate specific provisions to climate change effects or normative instruments in relation to conservation and ACUS declaration will be disseminated and of free access. This can be used to replicate the experience in other parishes.
At least 6 parishes trained to take care and use meteorological information generated by meteorological stations currently installed	The climatological information will be integrated with the technological platforms of the Ministry of the Environment and presented online and in an interactive way to facilitate the knowledge about the climate to all the population, including women, elderly and other vulnerable groups. The information will be transmitted in the form of bulletins to be delivered through the mobile phone services network in coordination with INAMHI. The climate information generated by the meteorological stations will be also included in the tools and methodology developed for the assessment of climate risks for financial institutions (output 4), in order to improve the predictability of software solutions used to assess the credits.
Component 2. Adapt farming practices to new climate change conditions enable their sustainable climate smart financing	
Outputs of the project	**Learning and knowledge management**
250 ha of pasture and 250 ha of crops apply sustainable farming practices	This output intends to use participative approaches (such as rural participaroty appraisal) to capture and/or define EbA practices. It will take advage of community participation with a gender approach. At field level, the promotion of best practices will be based on methodologies already used in the country (e.g. farmer field schools, extension, farmer-to-farmer), local knowledge, and collective community work. Training methods will take into account local ethno-cultural knowledge to ensure the mainstreaming of cultural issues in the proposals for plans and strategies, sustainable best practices, and forest conservation and management. Training events (e.g. courses, workshops, field days) will be timely programmed to ensure the participation of beneficiaries, especially women. In sum, stakeholders' ownership of best practices and EbA concepts will contribute to the sustainability of the acquired capacities. Systematized lessons learned will also contribute to capacity development and knowledge management.
At least 2 institutions have introduced specific solutions, risk assessment methodology to support the disbursement of credits for adaptation, integrate sustainable, and climate smart criteria in their whole operations.	Knowledge management activities consist on the development of traiinin material related to the EbA activities and its integration to finantial institutions operations. Methodologies and tools will be developen and documented to serve aas reploica for the rest of the country.

Table 311: Keys activities and knowledge

H. Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation, with particular reference to vulnerable groups, including gender considerations, in compliance with the Environmental and Social Policy of the Adaptation Fund.

350. Local groups and relevant government organizations we included in the consultative process during the project concept development phase. It started in 2015 by sharing the project idea and receiving feedback, impressions and recommendations from local stakeholders.

351. During 2016, several workshops we organizd to gather a bigger number of representatives and, in 2017, the invitation was broadened to a larger number of local stakeholders and to more communitie's representatives. It has been a gradual process aimed at to involve each time more and more relevant actors.

352. During 2017 workshops, a great emphasis was made on ensuring the presence of vulnerable groups' organizations and representatives to ensure the inclusion of their opinion and the roles that they will have during the implementation phase. During workshops, several factors were considered to be more effective: (i) provision of a favourable environment to facilitate that men and women would express their interest; (ii) the schedule of workshops does not interfere with their normal labor activities[45]; and (iii) organizacion of separate groups by sub-basin to have specific feedback.

353. This approach of building together with local actors the project activities based on their needs and challenges was useful to support the design of the project, to ensure local participation not only from vulnerable groups, but also from the different and relevant stakeholders from different sectors. Some indicators and means of verification were designed to monitor this participation during the implementation phase.

354. Nevertheles, there is still a possibility that in the meetings not all those involved were present. For this reason, during inception phase the project team will resume consultations with local organizations and vulnerable groups. This process will be done in coherence with social and environmental safeguards in order to ensure acces, participation, and the inivolvement on vulnerable groups.

[45] Considering that women can bring their children to the workshop and ensuring that there is an appropriate place to leave them under care

Summary of consultation workshops and meetings

355. Local stakeholders, approached in 2015, made their suggestions and expressed their expectations saying that they would be interested in a project that can protect the water sources (in the higher basins), promote a change in production patterns (especially near the rivers), identify and preserve the water springs and to strenghthen association and participation processes. During this phase, the local governments of Manuel Cornejo Astorga (Tandapi, Pichincha province), Palo Quemado (Cotopaxi province), Pampas de Aguilla (Cotopaxi province), recognized the project idea and expressed their will to supportthe initiative (see Annex 5).

356. In June 2016, the intervention area was visited to identify key stakeholders and gather initial information about their perspectives and needs. This information served to prepare the inception workshop. On July 2016, an inception workshop was held in Unión del Toachi (**Error! Reference source not found.**). Participatory rural appraisal techniques were used to gather local perceptions, views and opinions. Thirty-nine people participated (14 were female, 35.8%), including the main farmer´s organizations, all the parish governments, the two main municipalities (Sigchos and Mejia), local NGOs, and key government entities (e.g., MAGAP, SENAGUA, INAMHI, MAE). Transportation was provided to facilitate attendance of remote participantsas some areas are quite retired, with limited access to public transportation Participants from Sigchos (the most distant intervention site) had to travel for about three hours to attend the meeting. The memoir of the workshops (including list of participants) is in **Error! Reference source not found.** and **Error! Reference source not found.**

The workshop considered the following main elements:

- The existing knowledge about future weather conditions in the area, and the probable impacts of climate change were presented. The results of MAE´s analyses were handed in printed maps. The initial ideas of a project concept (i.e., draft results framework and budget allocation) were presented Participants were motivated to clarify doubts and present their views and experience.
- Two groups were formed, corresponding to the major sub-basins (Pilatón and Toachi). Each group prepared a participatory situation analysis, identifying the key issues, probable causes and groups involved. In plenary, priority issues were selected for each subbasin.
- The Toachi group presented among its main results a severe deforestation problem, agricultural expansion in forest areas, low productivity in farming production, weak protection of forests. Farmers have expressed that they would be motivated to preserve the forest if they receive support for increasing their productivity and improving their access to climate information. The Pilaton group highlighted the importance of strenghthening the connectivity of habitats and ecosystems, working in areas susceptible to to landslides and flooding,

and improving meteorological information, given the current lack of stations.The groups identified priority actions, probable sites, and local actors.

- The Toachi group identified in maps the potencial areas that need to improve preservation, the already existing protected areas that need to improve its management and the first steps to be taken in order to improve agricultural practices and the potential partners, they also prioritized the need to improve climate information and to include environmental training within schools.
- The Pilaton group identified, in a talking map, the location of water springs that will need to be potentially intervened first, the need to improve maps to better identify other priority areas for the project and the actors that will participate in the projectne.
- In plenary, the proposals were reviewed and adjusted. In addition, farmer organizations and parish governments confirmed their interest to contribute to project design and execution. There were recommendations of other key groups that need to be approached.
- Before finalizing the workshops, participants outlined a set of agreements for adjustments of the project concept, and pending aspects to be addressed in the following months (e.g., prepare maps using more recent information on land use and forest cover, analyse land tenure and conflicts in protected forests).
- As a result of the consultation process and based on the needs and recommendations expressed by the local institutions and communities, the project concept and specific targets were adjusted. After the disemination workshop, a stakeholder analysis was prepared (**Error! Reference source not found.**)[46].

357. In July 2017, several meetings were organized in Sigchos and Mejía, and the parish governments of Las Pampas, Palo Quemado,Manuel Cornejo Astorga and Aloag. During these visits, participants were informed about the progress and concerns about the project were collected. Participants were also informed about socialization workshops, remarking the importance of participation of women and vulnerable groups. Memories of the event are presented in **Error! Reference source not found.**.

    Socialization workshops were held in July 2017 in Sigchos and in Manuel Cornejo Astorga. In these workshps the groups analyzed in detail the implications of the project for the Toachi River basin. In Sigchos there was an attendance of 38 people, 42% were women. In Manuel Cornejo Astorga (Tandapi) there was an attendance of 49 people, 43% were women. An exclusive meeting was included in the agenda

[46] Mining companies, with concessions in the area of Palo Quemado and Las Pampas, are a stakeholder that had been overseen. Mining operations are initiating; therefore, this actor can have strong influence in the social and economic dynamics of the lower basin. The role of mining companies and their integration into the project will be assessed during project inception.

to work only with women and vulnerable groups. In this meeting a personal survey was carried out to better understand their impressions regarding the project.

The workshops included the following aspects:

- A brief introduction and contextualization of the project by the authorities of the CAF, MAE and local authority.
- Power point presentation was made, reinforcing the conceptual basis of the adaptation project, emphasizing the effects of climate change on the region and addressing the environmental degradation problem in the Río Blanco upper basin.
- The presentation of the components, outcomes and outputs of the project with the respective allocation of resources . In addition, a printed document with the data of the logical framework of the project was given to everyone.
- Subsequently, work groups were set up to carry out a component analysis, and then three groups were formed, moderated by one person from the group of consultants. Material was provided summarize and present the main points.
- Color maps were given to each of the groups so that the participants could be located geographically.
- Each of the groups gave a presentation of the relevant topics of discussion and group analysis. Comments and suggestions have been considered for the final version of the project.
- At the same time, an anonymous survey on conditions of access to credit was passed to the attendees
- Finally, an independent work with the groups of women and vulnerable groups was organized. ion of a given survey is individually filled. Survey format **Error! Reference source not found.**.

358. The workshops delivered importat inputs to support theselection of activities. The following is a summary of the working methodology to carry out this process with communities participating in the project:

a) Watershed Pilatón:

1. Relevant information about the project, macro activities and estimated budgets for each activity was exposed
2. Each of the participants was asked to detail their knowledge of the environment, support maps were used.
3. Each participant was asked to share their successful experiences regarding productive and environmental issues they have developed, considering their livelihoods.
4. The facilitators shared a set of guiding questions on the subject of gender, work of vulnerable groups and associativity.

5. In the working groups it was agreed that the women would lead the work table and present the findings around the proposals for the components in the plenary.
6. During the working plenary, the women were asket to provide comments on proposals for the conservation of the vegetation cover in the basin.
7. It is important to mention that the working groups identified indicators and means of verification that promote the participation of women, so, the zoning and planning of farms in this project must be executed with the participation of at least 50% of women, considering their close relationship with the environment and livelihoods in the area.

Below is a brief outline of the proposals made in the Pilaton work group:

Figure 40. Community consultation evidence

b) Watershed Toachi:

1. Relevant information about the project, macro activities and estimated budgets for each activity was exposed
2. Each of the participants was asked to detail their knowledge of the environment, support maps were used.
3. The facilitators shared a set of guiding questions on the subject of gender, work of vulnerable groups and associativity.
4. Due to the participation of the Municipal GAD of Mejía and Mgtr. Jorge Campaña, specialist in linkage MAE with GADs exposed experiences at the national level for

the creation of conservation areas (ACUS) biocorredores and other conservation categories that Ecuador has now undertaken.

5. In the working groups, it was agreed that the women would lead the worktable and present in the plenary the findings on proposals for the component
6. The participants proposed that, initially, the conservation bio-corridor should been declared, which should include: (i) *a study of land tenure, (ii) an Environmental Management Plan, (iii) a Financial Strategy for the sustainability of the proposed Biocorridor and (iv) a Management model*
7. In the working group it was considered to formalize the constitution of the Conservation Areas and the Biocorridor through the support of the GADs. Also that the Biocorridor priority areas should be selectedunder existing criteria.. The need to establish fixed control points and the improvement of the hydrometeorological monitoring system was highlighted.

Below is a brief outline of the proposals made in the Toachi work group:

Figure 41. Community consultation evidence Toachi

359. Durimg juky 2017, several meetings were organized with INAMHI and sENAGUA to inform about the proress in project preparation.

I. Provide justification for funding requested, focusing on the full cost of adaptation reasoning.

360. The present project will allow to mainstream adaptation into local communities and implement actions to address specific threats and barriers. The AF contribution will allow to implement three key adaptation measures within a watershed perspective: (i) to conserve vegetation cover, (ii) to reduce pressure from farming activities, and (iii) to engage the local population into climate change adaptation.

Component 1. Conserve vegetation cover

Baseline

361. The two existing protected forest (Toachi – Pilaton and Sarapullo), cover a large area of the water system (ca., 230,000 ha) to safeguard the water cycle. MAE´s Forestry National Directorate is responsible for managing the forest. However, these areas are not being managed and guarded. Farmers have invaded and cleared extensive areas to establish grazing areas and extensive farming systems. Some invaders have claimed possession rights to the municipal and central authorities, creating a severe land tenure issue; which should be managed with the biocorridor process. The extent of the invaded area is unknown.

362. Some landowners have established private reserves to conserve biodiversity. There are at least three private reserves covering about 2,800 ha. However, there are limited incentives to maintain forest areas in natural condition. Private landowners of forest areas also face pressure from illegal farmers.

363. It is foreseen that climate change will reduce rainfall in the Río Blanco upper water system and produce stronger and more frequent ENSO events. Deforestation and forest degradation will exacerbate climate change impacts. The reduction in water availability will affect farmers, household water use, water companies and the HIDROTOAPI hydroelectric plant.

With Adaptation Fund investment

364. The project will support the protection of forest cover to mitigate, as much as possible, the impacts from climate change. The key premise is that a large forest will better tolerate changes in weather conditions and will continue to capture moisture and feed river streams.

365. The project will allow to:

- Develop and implement a system of incentives to finance the conservation of the existing protected forests and to provide incentives to landowners that voluntarily commit to the conservation and protection of their native forests and vegetation. The investment fund that will be established in the project contributes to finance incentives for adaptive investments providing contributions for a better water use and invest in forest conservation (e.g., incentives to landowners, protection, reforestation), training, technical assistance, etc.

- Strengthen the institutional and legal framework to manage and protect the Toachi – Pilaton and Sarapullo protected forest and private reserves.

Component 2. Adapt farming practices to new climate change conditions

Baseline

366. Local farmers contribute to forest degradation. Their production is based on extensive, subsistence farming, and the application of inadequate practices that contribute to soil degradation and erosion. The main pressures come from livestock producers and sugarcane farmers. Livestock producers clear forests and use river margins to establish grazing grounds. Sugarcane farmers, mainly based in Las Pampas and Palo Quemado parishes, clear forests to expand the production area and to obtain firewood for the artisanal production of panela. Each family furnace consumes about three trees per week.

With Adaptation Fund investment

367. AF support will allow introducing sustainable farming practices to increase production per unit area, therefore reducing the need to clear forest to expand farming areas. Improved farming practices will be introduced in at least 250 ha of livestock production and 250 ha of crops of sugarcane, mortiño and naranjilla. The project will work with farmers´ and women organizations in Las Pampas and Palo Quemado parishes.

368. Panela production will be analysed and upgraded with the furnaces that will be introduced to improve efficiency (less energy and equal or more production) and to reduce the consumption of firewood.

369. Specific methodologies and software solutions will be developed for financial institutions providing credits for agriculture activities in the area, supporting them to understand climate risk and environmental impacts, and incorporating in their credit assessment sustainability criteria and climatic issues.

Component 3. Strengthen local capacities and share lessons

Baseline

370. The local population and stakeholders are not fully aware of the climate-related risks, and are not engaged into taking action to increase their adaptation capacities. Parish plans mention climate change but do not incorporate concrete actions to implement adaptation measures.

371. INAMHI has eight meteorological stations in the area, but only one is operating. Therefore, weather monitoring is very limited and the local population do not have access to sound information for decision-making. In addition, INAMHI has serious

financial limitations to sustain the operation of a network of meteorological stations in the area.

With Adaptation Fund investment

372. With AF support, a public communication and education plan focused on the parish governments will be developed. It will cover about 2.035 people (553 families) of the six parishes that are part of the Río Blanco water system. In addition, the project will directly support parish governments to mainstream climate change into the local development plans. This will allow to engage local stakeholders into climate change adaptation action, and will be a valuable catalyst to increase local resiliency and build social capital. Training will be provided also to farmers to implement adaptive investment and to financial institutions to understand climatic and environmental risks and opportunities.

373. The project will also allow to update and expand INAMHI's hydro-meteorological network in the area. Sediment samplers will be installed to monitor sediment load. Partnerships will be developed to sustain the operation of the hydro-meteorological network and to feed the information to local stakeholders. An option is to include these costs into the water fund that is being considered.

J. Describe how the sustainability of the project outcomes has been taken into account when designing the project.

374. The project will have positive environmental impacts. There will be actions to contribute to maintain vegetation cover and to reduce pressures from deforestation and expansion of the agriculture frontier.

375. The sustainability of actions has been planned based on three criteria: i) concordance with the regulatory framework; ii) availability of resources and economic criteria; and 3) communities empowerment.

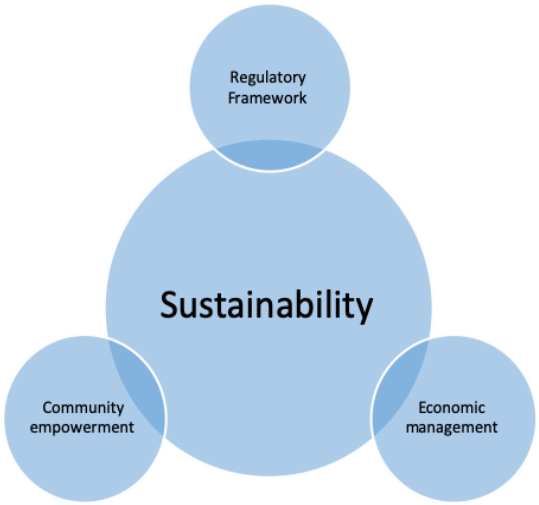


Figure 422. Initial sustainably concept in the project

Sustainability, in all its manifestations, is the life capacity of an action or process over time, which has environmental, social, economic and technological scope that its implementation will be during the 4 years of the project. Then, co-executors must complete the appropriation process, which is understood as the transformation of co-executors into owners. Actors are incorporated as assets and social capital and not as social charges. This will be achieved by giving access to resources, self-management, employment, promoting mechanisms of social and economic organization and their participation in decision-making processes, including the vulnerable group, as well as their insertion in the market economy.

Figure 433. Sustainability environmental, social ans economic

In the design of the project, the concept of sustainability is outlined as achievable by taking the development in an integral way through the capacity building that is addressed

in component 3 of the Adaptation Project. Evaluation: It is proposed as monitoring and evaluation instruments: monthly reports of the technicians, forms of progress records, attendance record in workshops, training.

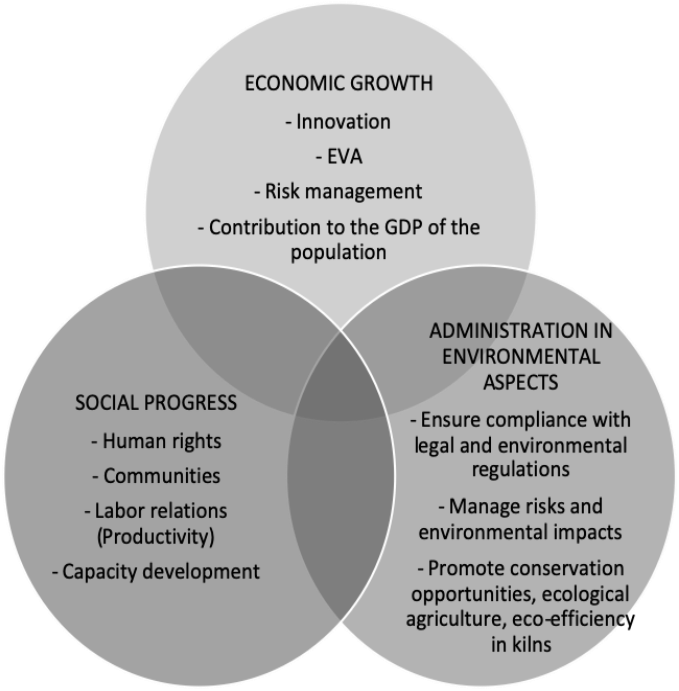


Figure 44. Transversal Sustainability

376. The project has foreseen to have an integral approach in terms of promoting sustainability with different actors from different stages:

1. The capacity building process will strenghten the capacities of local communities in terms of conservation, improve agricultural and productive practices and empower communities by promoting association and support a better access to markets. The project will support the process of promoting association through a better organization, dialogue, participation and exchange between them until co-executors can consolidate this engagement.The fact of empowering communities, enhancing their knowledge, improving their yields through more sustainable practices and promoting association gives an advantage to ensure sustainability of these practices in the long term.
2. The credit mechanism is sustainable with the investment fund. It is foreseen that parish governments and other project partners will integrate actions into their institutional budgets to ensure post-project sustainability.

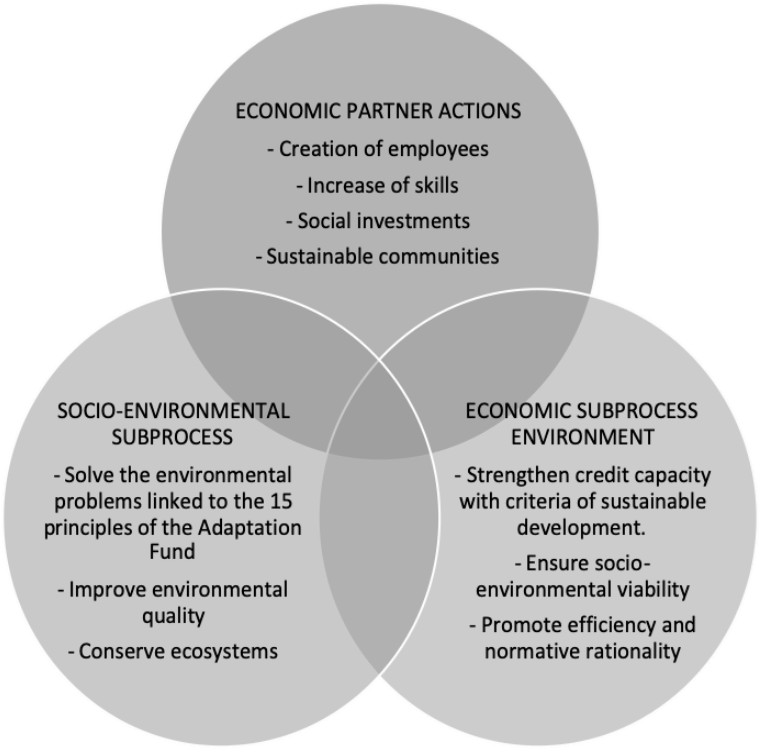


Figure 45. Final sustainably concept in the project

377. Based on the aforementioned, a sustainability strategy is proposed for each component as described below:

Component	# of Co-executors (families)	Activity	Regulatory Framework	Economic management	Community Empowerement +
C1. Conserve vegetation cover	178	Improve management of protected forest.	Environmental Organic Code [47] art, 42. Establishment of a financial strategy for the management of conservation areas (Biocorredor)	Development of a financtial sustainability model: Art. 42 COA Operation of the investment fund.	A functional biocorridor management model with the participation of communities.
		Increase conservation area	Socio Bosque mechanism	Payment for Environmental Services	ACUS – Biocorridor Management Plants

[47] Environmental Organic Law. Available in: http://www.asambleanacional.gob.ec/sites/default/files/private/asambleanacional/filesasambleanacionalnameuid-29/Leyes%202013-2017/102-ambiente/ro-cod-ambiente-ro-s-983-12-04-2017.pdf

C2. Adapt farming practices to new climate change conditions, enabled by sustainable climate smart financing	375 (250 for crops and 125 for livestock)	Sustainable farming practices and livestock adjusted to local realities are being introduced and implemented with assistance of financing mechanisms for adaptation measures	COOTAD Law, Good Living National Plan Sustainable Development ObjectivesObjtives principe 4	Productivity increase and marketing skills improvement. Advice on access to markets and commercialization.	CommunitiesCommiunuities organization
		At least 1 long term financing mechanisms has been piloted or introduced	National Water Law for Investment Fund	Operative financial mechanism mecanism	Effective credit access and incentives
C3. Strengthen local capacities and share lessons	553 directluy 14000 indirectly local communities 49367 indireddly in river basin	At least 6 parishes being built capacities and prepared to manage and use meteorological information.	National Climate Change Strategy and COOTAD	Avoided costs of inaction in adaptation	Effective participatory planning
		Six development plans of local parishes incorporate measures for ecosystem-based adaptation to climate change.	National Climate Change Strategy	Avoided costs of inaction in adaptation	Effective participatory planning
C3. Strengthen local capacities and share lessons	553 directluy 14000 indirectly local communities 49367 indireddly in river basin	Strategic plan of communication, education, knowledge transference and scheme of replica, including demonstration farms. Plus training on adaptation finance to financial institutions	National Climate Change Strategy	Improvement of productive and knowledge practices	Knowledge management
		Systematisation of information gathered during the whole project design and implementation using existing informatics platforms	National Climate Change Strategy	Replica to other initiatives	Knowledge management

Table 42: Sustainability strategy matrix

378. In 2017, Ecuador issued the Organic Environmental Code – COA that defines the guidelines for the operation of the conservation areas in Ecuador. In its article 42 about the management tools defined for the protected areas are: 1.-The Strategic Plan of the National System of Protected Areas; 2.- Management Plans; 3.- Operational Management Plans; 4.-Management Effectiveness Evaluations; 5.-The Strategies of Financial Sustainability; and, 6.- The others determined by the National Environmental Authority.

379. To promote an active participation in the conservation processes and at the same time in the evaluation of the state of conservation as an element of control over the actions taken in the project, the elements of Financial Sustainability Strategy and Management Effectiveness, which have been included in the present project, are important.

380. Similarly, the conservation areas (1000 ha) are based on the concept and mechanism of Socio Bosque, however it will be managed and developed by the project with the support of the project implementation agencies, although it has the concept of Socio bosque, it does not include transfer of direct economic resources to the state program Socio Bosque. During project execution, a post-closure strategy will be developed that will propose as an alternative that the conservation areas under the project be included in the Socio Bosque state program so that the initiated process remains 20 years in the future, such as the original mechanism.

381. Social sustainability will be based on the participatory approach and the integration of key stakeholders, where women's participation plays a major role. Engaging both men and women to participate in decision making processes could result in a greater likelihood of sustained change (UN-REDD, 2013); however, additional training targeted to women may be needed to ensure their full contribution mainly the planning farms.

382. The project will promote multi-level dialogue, networking and collaboration to build social capital in support of watershed conservation. The capacity building process established in component 3 will strenghten the capacities of local communities in terms of conservation improve agricultural and productive practices, and empower communities by promoting association and support a better access to markets.

383. The project will support and accompany the process of promoting association through a better organization and through institutionalizing more frequents spaces of dialogue and interchange between them until they can consolidate this engagement and interchange spaces that will make them stronger. The fact of empowering communities, enhancing their knowledge, improving their yields through more sustainable practices and promoting association gives an advantage to ensure sustainability of these practices in the long term.

384. Social and economic sustainability will be complemented by strengthening capacities and providing advice to the project co-executors in access to markets and commercialization. This is a necessary complement because after receiving training to improve their farming, production and conservation practices, their products needs to successfully reach consumers in order to increase their economic incomes contributing thus to improve their life quality.

385. The project is anchored in pertinent local and national authorities responsible for local development and climate change adaptation. Parish governments are the centerpiece of the project, but it will also involve municipal and provincial governments, pertinent sectoral authorities (e.g., MAGAP, SENAGUA) and community organizations (e.g., Flor de Caña). It is foreseen that through this networking the core elements of the project will continue in the institutional agendas. To ensure this continuity, the project will seek to sign cooperation agreements or letters of commitment between the local governments and the Ministry of Environment (during the initial consultations local governments provided a letter where they recognized the project idea and their will to support), which will provide

detail of the activities that they will commit to do in the present and in the future to ensure sustainability.

386. An investment fund is considered as a financial and technical mechanism to sustain critical elements like forest conservation, technical support to local farmers and weather monitoring. It is expected that water users (especially GADs) will be motivated to contribute to the investment fund to maintain long-term key actions.. The project will motivate and promote the engagement of other actors like the hydroelectric to contribute to this purpose once the project is running. However, as the hydroelectric has faced some delays on the construction process, the project team will work to promote their contribution for this purpose. The project will contribute to ensure that the minimum requirements to create the fund are in place, envisioning its permanence and it will develop long-term plan for this purpose. This activity is an important step to improve the ecosystem of promoting sustainability and formal credit mechanisms for this area and at the same time an opportunity to incorporate gradually the private sector in these efforts.

K. Provide an overview of the environmental and social impacts and risks identified as being relevant to the project.

387. The Adaptation Fund´s Environmental and Social Policy (ESP) (AF, 2013) aims to avoid unnecessary environmental and social harms caused by an AF-funded projects and programmes. The ESP requires the projects risks are screened against the AF´s 15 principles of environmental and social safeguards, and categorised accordingly to the level of potential negative impacts. Projects that present environmental and social risks must undergo a risk/impact assessment, and prepare an Environmental and Social Management Plan (ESMP). The ESMP establish the necessary measures to mitigate or to avoid adverse environmental and social risks and impacts.

    The project was screened and assessed as required by the ESP. The results of the screening process are presented in **Error! Reference source not found.** Annex 7 was developed based on the Manual of Basic Environmental and Social Management System procedures where environmental and social risks are identified, impacts are assessed and prevention and mitigation actions are identified based on the 15 principles of the adaptation. It consolidates the information demonstrating compliance with the ESP in a single document. The document is divided in five sections: 1. Summary description of the project, 2. risk identification and categorization, 3. Environmental and social management plan. 4. Monitoring and evaluation arrangements and 5. Grievance mechanism, according to the following scheme:

388. The principle on gender equity and women´s empowerment has to be considered transversal in all project outputs. During project inception, it will be necessary to

assess those actions on forest conservation and improved farming practices, do not overload the workload of women and other family members. It has been seen that local men are engaging in paid jobs in Santo Domingo (capital of the de Santo Domingo de los Tsáchilas province). Therefore, the farm management is being delegated to other family member. In addition, it will be necessary to ensure that the adaptation actions are mainstreamed into the local development plans and the communication and education actions are gender and age sensitive and do consider the needs of persons with disabilities. These elements integrated in the environmental and social impacts and risks ESMP **Error! Reference source not found.**

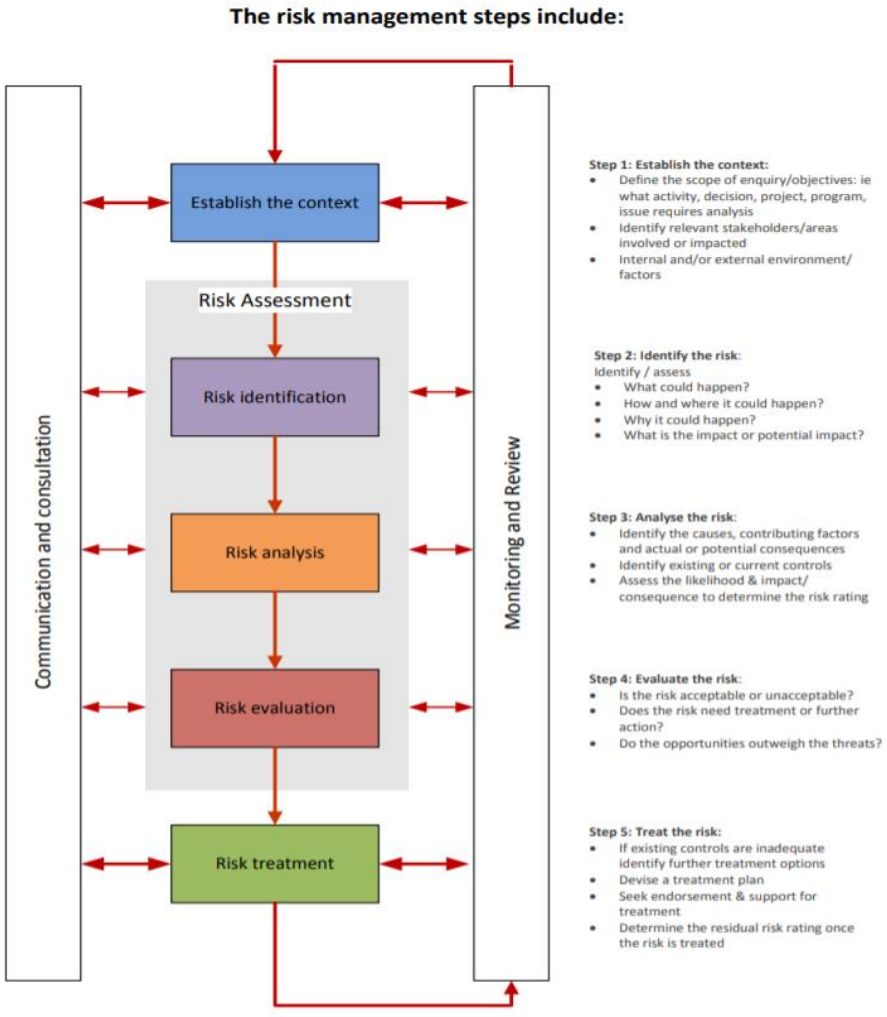


Figure 46. Risk Management Steps

L. Environmental and social impacts and risks identification in compliance with the AF ESP

ESP Risks Identification

Annex 7 presents, the checklist that shows the compliance with the economical and social principles. Each principle compliance is evaluated by answering with YES or NO to the questions identified for each principals. The questions answered with NO indicate a potential risk for the compliance of project principles, which translates into associated risks. On the other hand, principles whose questions have been answered with YES do not present associated risks.

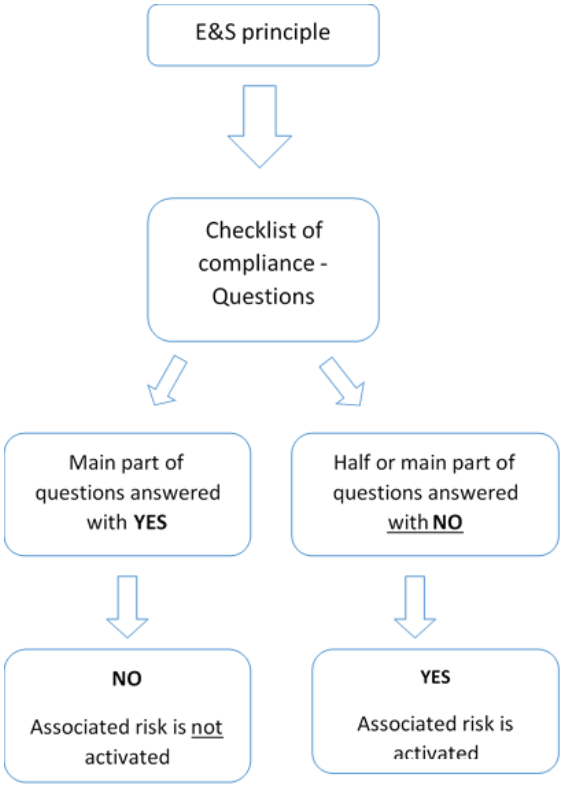


Figure 47. Process for the compliance with the economical and social principles

389. In addition, a screening was done using CAF´s preliminary environmental and social risk analysis matrix (instrument FR-086 as presented, which is part of CAF´s environmental and social management system). As stated in ESP´s article 8: “implementing entities that use a different but functionally equivalent system of

categorization can continue to use that system and still meet the requirements of the policy".

390. The project execution may generate few and minor potential environmental and social impacts and risks that should be reversible and easy to avoid or mitigate. Therefore, the project is categorized as Category B, according to the classifications established in the ESP.

391. A brief overview of the project compliance with the expected outcomes of the 15 environmental and social principles is presented in the following paragraphs.

Principle 1: Compliance with the Law.

392. The project has been designed to comply with all the relevant national laws, regulations and policies, especially with current environmental regulations. The Bio-corridor and investment fund in the project will require a specific coordination with the national laws about Protected Areas and Watershed Committees. The responsible for public declaratory (GAD still to be defined) will require a participative process engaging the Ministry of Environment. On theother hand, the water investment fund will be adapted to the national regulations in coordination with SENAGUA.

Principle 2. Access and Equity.

393. An initial stakeholder analysis was prepared (**Error! Reference source not found.**). Key stakeholders were identified, as well as existing or potential conflicts that might affect project execution. The analyses found no evidence of disagreement to the project proposal, or conflicts that could affect project execution.

394. In general, the project actions will promote access to basic services and land rights. However, it is noted that measures need to be taken to ensure that local groups are adequately informed of the project intervention, mainly the actions to conserve the forest cover and the mainstreaming of adaptation measures into the local development plans.

395. During workshops that took place in July 2017 at Sigchos and Tandapi respectively, all the information about logical framework, outcomes and outputs were presented to all attendants. There were work groups to analyse deeper how the implementation must be done, their participation and all their suggestions about improvements were

included in **Error! Reference source not found. Error! Reference source not found.**.

Principle 3. Marginalized and Vulnerable Groups.

396. During the socialization woskshops (Annex 5 and 6), vulnerable and marginalized groups were identified in the project intervention area (women, children, elderly and disabled). These groups will not be negatively affected by the project scope and activities, since the project aims to empower these communities. them.

397. Regarding the no discrimination of vulnerable groups, the project has designed a process of allocating and distributing its benefits. The criteria for selecting project activities, beneficiaries and co-executor is explained in figures 11, 12 and 13 of the project document.

Principle 4. Human Rights.

398. Ecuador has ratified the core international human rights treaties. The US Department of State Country Reports on Human Rights Practices for 2015 indicate that the principal human rights problems in Ecuador are excessive force and isolated unlawful killings by security forces; arbitrary arrest and detention; and delays and denial of due process. Violence and discrimination against women, children, minority groups, and the lesbian, gay, bisexual, transgender, and intersex (LGBTI) community; trafficking in persons; and child labour persisted.

399. Despite the general context, in the area of work no specific issues concerning human rights were identified that could be exacerbated by the project intervention.

Principle 5. Gender Equality and Women's Empowerment.

400. Ecuador ranks high in the Global Gender Gap Index. Ecuador has almost complete equality in educational attainment and health and survival, and a high level in economic participation and opportunities, but a major gap in political empowerment (WEF, 2015). The stakeholder analysis (**Error! Reference source not found.**) found that there is strong women leadership in local organizations and parish governments. In addition, women have an important role in businesses like commerce and restaurants. The condition of women in the Río Blanco upper watershed is similar to other Ecuadorian rural areas.

401. Illiteracy rates are higher for women, particularly in rural areas, and tend to have completed less years of formal education (see Gender Analysis, **Error! Reference source not found.**). Female labor force participation is lower than men's (57% against 81%), which is consistent with a high proportion of women lacking any

source of personal income (35%), in comparison with men (9%). There is an earnings gender gap: female's average monthly earnings represent 78% of male's average monthly earnings. Feminity index in poor households was 117.6 in 2013, meaning there were more females than males living in poor homes in Ecuador.

402. The project will promote women´s participation in project activities. However, it has to be considered that men are increasingly seeking payed jobs in Santo Domingo, the nearest large city. This, in turn, increases the workload for women in their farms. In rural areas, women tend to work more average weekly hours than men, 82h and 59h, respectively, and most of this difference is explained by non-remunerated activities (such as domestic chores and care-taking tasks). Therefore, the project will have to be careful to implement actions in support of gender equality and women´s empowerment, and to prevent overloading women activities (outputs 1, 2 and 4). Also, it will be needed to ensure that the adaptation actions to be mainstreamed into the local development plans (output 7) and the communication and education actions (output 9) are gender and age sensitive and do consider the needs of persons with disabilities. Mitigation measures are included in Annex 7.

Principle 6. Core Labor Rights.

403. Ecuador has ratified the eight core labor conventions. The project intervention has no implication with the four fundamental principles and rights at work. The project will be implemented in compliance with legislation including the Labour Code.

Principle 7. Indigenous Peoples.

404. ILO convention 169 is in force in Ecuador. Nevertheless, Ecuador in its Constitution of 2008 recognizes both indigenous peoples' land rights and livelihoods and the rights of nature. The Constitution's third part titled Rights, Duties, and Guarantees declares collective rights as they pertain to indigenous peoples. Article 84 states that the State shall recognize and guarantee indigenous peoples rights, in conformity with the Constitution, the law, human rights and collective rights. There is no indigenous population in the project area

Principle 8. Involuntary Resettlement.

405. There is no resettlement of communities in the project area. The project will not permanently or temporarily remove people from their homes or means of production/livelihood or restrict their access to their means of livelihood.

406. The proposal of component 1 is the creation of biocorridors that allow the interaction of ecological connectivity, sustainable productive landscapes, the association of biodiversity and landscape. Sustainable forest management practices and conservation mechanism will be implemented in coordination with the community

and beneficiaries. Component 2 focuses on the implementation of climate change adaptation measures among beneficiaries and improving their access to climate smart financing.

407. With the aim of achieving the impact under the territorial approach, at the beginning of the project a participatory territorial planning process will be carried out in order to identify priorities and carry out the land use plan.

Principle 9. Protection of Natural Habitats.

408. The project and its activities will have a positive impact on principle 9 of the environmental and social policy of Adaptation Fund. The project will strengthen the conservation of the Illinizas Ecological Reserve and will improve other conservation areas such as protective forest. In addition, it will be important to ensure that the role of natural habitats is integrated into the adaptation measures to be mainstreamed into the local development plans (output 7).

409. The project seeks to reduce the main sources of deforestation and degradation, rescuing natural spaces and habitats that previously existed and that are now necessary for the recovery of flora and fauna in the area. It also seeks to protect forests that provide multiple benefits to communities and production sectors.

410. Project activities will not involve unjustified conversion or degradation of critical natural habitats, including those that are (a) legally protected; (b) officially proposed for protection; (c) recognized by authoritative sources for their high conservation value, including as critical habitat. Measures wuill be taken to avoid any risk associated to the intervention.

411.

Principle 10. Conservation of Biological Diversity.

412. Ecuador has signed and ratified the Convention on Biological Diversity and have a recently updated its National Biodiversity Strategy.

413. The project will not intervene areas with high value biodiversity or introduce invasive species. In addition, the project project will not change a natural ecosystem to an agricultural unit with a reduced diversity of flora and fauna.

414. The project will be implemented in a way that avoids any reduction or loss of biological diversity or the introduction of known invasive species, however, as Unidentified Sub Project selection will be taken during the implementation, they will need to undergo detailed screening, a consultation process, and the development of safeguard measures and a strict approval method.

Principle 11. Climate Change.

415. The project does not include activities that involve a significant increase in emissions of greenhouse gases or other climate change stressors. On the contrary, the implementation of sustainable agriculture practices will reduce greenhouse gas emission, contributing to climate change mitigation. Moreover, reducing community vulnerability thanks to EbA practices, the project will also contribute to support climate change adaptation for the community.

416. Additionally, the projects seeks to strengthen local capacities in climate change by enforcing local capacities in the use of meteorological information provided by hidro-meteorological stations. The understanding of hidrometeorological information is essential for the development of local risk reduction strategies as for example the formulation and implementation of contingency and emergency plans and early warning systems.

Principle 12. Pollution Prevention and Resource Efficiency.

417. The project does not include activities that will use large quantities of energy, water or other natural resources. Nor they will generate large quantities of residues, emissions and discharges. Nonetheless, as indicated before, CAF will require that building contractors implement a PAAS to prevent negative impacts during construction works (mitigation measures 1 and 17). The project will contribute to improve the efficient use of energy and natural resources.

418. The project seeks to improve the mechanism (oven and mills) for panela production in order to reduce the emission of greenhouse gases and other noxious gases for human health and vegetation. Nowadays, because of the lack of maintenance of the mills motors, which leads to failures in the combustion system, smoke is produced in the production of panela. In addition, in the evaporation process realized in the oven, bagasse is used which contributes to higher levels of pollutions and low resource efficiency. Because of the low efficiency of bagasse, people (producers) are forced to include other combustible materials, such as wood, tires and coal in the production process, which have an additional negative impact on the climate, environment and human health.

419. The project will not promote the use of pesticides. Instead, it will promote sustainable pest management approaches such as Integrated Pest Management (IPM), the use of ecological pest management approaches and the use of mechanical/cultural/physical or biological pest control tools in favor of synthetic chemicals; and preventive measures and monitoring.

Principle 13. Public Health.

420. The project does not imply negative impacts on public health. Moreover supporting the use of efficient cooking systems for panela, as well as the promotion of family gardens, the project will contribute to reduce negative health impacts.

Principle 14. Physical and Cultural Heritage.

421. Ecuador is a party of the World Heritage Convention. The project will not affect or intervene physical and cultural heritage.

Principle 15. Lands and Soil Conservation.

422. The project activities will not result in the degradation (biological or physical) of soils. On the contrary, the project action will contribute to introduce and strengthen land management and conservation.

423. The project will strengthen conservation in the Illinizas Ecological Reserve and will improve other conservation areas such as protective forest. Both are areas that provide ecosystem services. Conservation and sustainable land management and farming practices will improve soil´s conditions in the landscape.

424. The hydroelectric power plant is not part of the present project, but it is worth mentioning that it has an Environmental Impact Assessment, an Environmental License, and an Environment and Social Management Plan. Its construction did not involve displacement of vulnerable groups. The plant is under construction; it is expected to begin operation during 2021.

425. The Toachi Pilatón Hydroelectric power plant is within the Adaptation Project Area, although there are two different work fronts, the analysis of the associated risks of the Hydroelectric Power Plant during the construction and operation phase has been carried out with the risks identified in the Project area before its implementation.

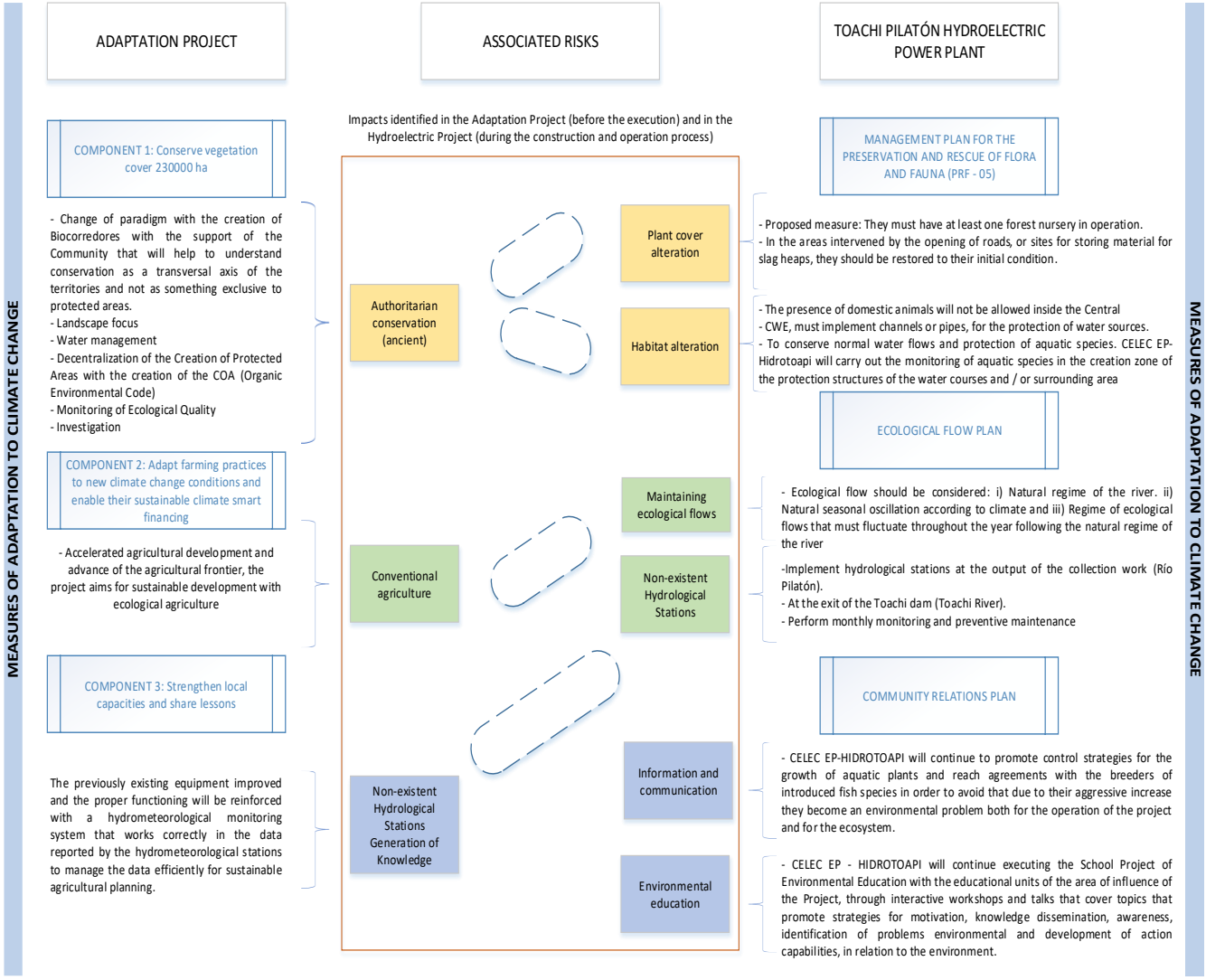


Figure 48. Plan Associated risks of the Adaptation Project and the Hydroelectric Power Plant

The following table present the summary of environmental and social risks.

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
Compliance with the Law	X	
Access and Equity		X
Marginalized and Vulnerable Groups		X
Human Rights	X	

Gender Equity and Women's Empowerment		X
Core Labour Rights	X	
Indigenous Peoples	X	
Involuntary Resettlement	X	
Protection of Natural Habitats		X
Conservation of Biological Diversity		X
Climate Change	X	
Pollution Prevention and Resource Efficiency	X	
Public Health	X	
Physical and Cultural Heritage	X	
Lands and Soil Conservation	X	

Table 43. Checklist for environmental and social principles

The environmental and social risks analysis was performed based on annexes 4, 6 and 9. The detailed risk analysis as well as the mitigation measures can be visualized in Annex 7. The following tables present the analysis of significance of the risk and the mitigation measures for those principles with moderate and hight risk. An Enrivoronmental and Social Management Program has been developed (Annex 7).

Significance of the Risk Evaluation

Significance of the Risk			
Checklist of E&S Principles	**Risks Identified per E&S Principles**	***Impact and Probability (1-5)***	***Significance Low, Moderate, High***
1.Compliance with the law	Risk low. The existing protected forests are regulated under the forestry law. The private conservation areas are recognized under the Ecuadorian law.	1 / 1	Low
2. Access and Equity	Risk moderate: Local landowners not adequately informed of the proposed use of economic incentives (Socio Bosque, Biocorredor, ACUS, sustainable agriculture). If not adequately informed, the local landowners may believe that the project will affect their land rights.	3 / 3	Moderate

Significance of the Risk			
Checklist of E&S Principles	**Risks Identified per E&S Principles**	***Impact and Probability (1-5)***	***Significance Low, Moderate, High***
3. Marginalized and Vulnerable Groups	Risk moderate. Risk associated to the probable increase of the workload for women, which could at the same time, limit their opportunity to access to project benefits. .	3 / 3	Moderate
4. Human Rights	Risk low. No specific issues concerning human rights were identified that could be exacerbated by the project intervention.	1 / 1	Low
5. Gender Equity and Women's Empowerment	Risk high. There is a risk that women or men have unequal opportunities to participate, without taking into account their living, social and economic conditions. This refers to Component 1, Component 2 and Component 3. As some farmers are opting for paid employment in Santo Domingo, this increases the responsibility of women´s work in the farm. The communication channels and messages should be gender, age sensitive, and consider the needs of persons with disabilities. If not, there is high risk of not empowering women with the project.	4 / 3	High
6. Core Labour Rights	Risk low. The project will be executed considering all core labor standards as identified by the International Labour Organization (ILO).	1 / 1	Low
7. Indigenous Peoples	Risk low. The areas of intervention will not affect indigenous groups or territories	1 / 1	Low
8. Involuntary Resettlement	Risk low. The project intervention does not imply displacement of local population.	1 / 1	Low
9. Protection of Natural Habitats	Risk moderate. The project intervention does not involve unjustified reduction or loss of biological diversity or the introduction of known invasive species. On the contrary, project actions will motivate the conservation of existing vegetation cover (Positive impact). However, if activities, especially agricultural production, are not implemented of monitored consequently, it could lead to unjustified degradation of natural habitats. As the decision of which Unidentified Sub Project will be implemented will be taken during the implementation, they will need to undergo detailed screening, a consultation process, the development of safeguard measures and a strict approval method developed.	2 / 3	Moderate

Significance of the Risk			
Checklist of E&S Principles	**Risks Identified per E&S Principles**	***Impact and Probability (1-5)***	***Significance Low, Moderate, High***
10. Conservation of Biological Diversity	Risk moderate. The project will be implemented in a way that avoids any reduction or loss of biological diversity or the introduction of known invasive species. If activities, especially agricultural production, are not implemented of monitored consequently, it could lead to unjustified reduction of biological diversity. As the decision of which species will be used, this Unidentified Sub Project will need to undergo detailed screening, a consultation process, the development of safeguard measures and a strict approval method developed. For the above there **is a risk** of not avoiding significant or unjustified reduction or loss of biological diversity or the introduction of unknown invasive species. This is referred to in Component 1.	2 / 3	Moderate
12. Pollution Prevention and Resource Efficiency	Risk low. The project intervention will not use large quantities of energy, water or other natural resources. Neither will produce waste and release pollutants.	1 / 2	Low
13. Public Health	Risk low. There is a risk that the implemented activities may produce potentially significant negative impacts on public health.	1 / 1	Low
14. Physical and Cultural Heritage	Risk low. The project intervention will not affect or intervene physical and cultural heritage.	1 / 1	Low
15. Lands and Soil Conservation	Risk low. The project intervention will not negatively affect valuable land. On the contrary, project actions will contribute to soil conservation.	1 / 1	Low

Table 324. Checklist of environmental and social impacts and risks of the project

Managememt plan to minimize negative impact risks

Checklist of environmental and social principles	No additional management plan is required for compliance	Management plan necessary to minimize negative impact or ensure positive impact
1. Compliance with the Law	The project does not contradict the Constitution of the Republic of Ecuador, the laws, regulations and all the regulations that derive from it. One of the main principles of the Constitution is the recognition of the right of the population to live in a healthy and ecologically balanced environment (Constitution of the Republic of Ecuador, 2008), aligned with the objectives of the project. The Ecuadorian Legislation protects this first principle in conservation of natural areas, as well as the right to safe and permanent access to healthy food, which will be achieved through the application of good agricultural practices as indicated in article 281 of the Constitution of Ecuador. The Organic Law of agrobiodiversity, seeds and promotion of sustainable agriculture, dated June 8, 2017, establishes the following principles in article 4: sustainability, inter culturalism, prevention, solidarity, participation, control and transparency, national supply, social equity, gender and generational, efficiency and heritage that assure the relevant cultivated and biological diversity of the genetic resources for food and agriculture and the cultivated and biological diversity of relevance for food and agriculture. It is constituted by: (1) plant, animal, microbial and fungal genetic resources; (2) the organisms necessary to sustain key functions of the agroecosystem, its structure and processes, such as the regulation of pests and diseases, and the cycle of pollination and nutrients; and (3) the interactions between abiotic factors, such as the physical landscapes in which agriculture is developed, and the socio-	

Checklist of environmental and social principles	No additional management plan is required for compliance	Management plan necessary to minimize negative impact or ensure positive impact
	economic and cultural dimensions, such as local and traditional knowledge. This project is designed to comply with the provisions of the Universal Declaration of Human Rights and all the agreements, protocols, declarations, resolutions and agreements that derive from this declaration, promoting equity and the rights of vulnerable groups.	
2. Access and Equity		During the execution of the project, the existing access to basic services of health, tap water, energy, education and housing will not be affected. Although the first component of the project proposes the conservation of the forest with a bio-corridor, the land rights of the owners will not be harmed. The measures to avoid and / or mitigate potential negative impacts are: - The project will make sure compliance with the ESP 2 by describing the process of allocating and distributing project benefits. It will ensure that there will be neither discrimination in accessing project benefits. The criteria for selecting project activities, beneficiaries and co-executor is explained in figures 11, 12 and 13 of the project document. It will help to overcome their constraints in the access resources and services and to participate in decision making - It is essential for the project to integrate all the beneficiaries in its activities, due the actual disproportionate access to resources of farmers, mainly of female farmers. Today it is known that the women of each area or village are the ones who will share the knowledge to future generations, as they are the main actors of knowledge strengthening in rural areas. Measures related to women's access to resources are explained in ESP 5. - Information and communication campaigns will be carried out, in order to reach a greater number of beneficiaries and to keep them informed about project execution. The project seeks to guarantee that every beneficiary

Checklist of environmental and social principles	No additional management plan is required for compliance	Management plan necessary to minimize negative impact or ensure positive impact
		has access to clear and precise information through workshops, field visits, Farmers Field Schools and other activities. These activities will help to provide access to new knowledge and the possibility of accessing project benefits in order to implement adaptation measures and good practices in the rural areas. The communication plan will include specific women associations and organizations. - The project will have a grievance mechanism in place. The PMU will be responsible for the compliance, monitoring and assessment of the ESP.
3. Marginalized and Vulnerable Groups		The project aims to empower vulnerable communities, such as women, children, elderly and disabled people. In compliance with ESP 3, and in order to avoid and/or mitigate any potential negative impact related to the project, the following measures will be applied: - The project team will update the description of marginalized and vulnerable groups and their risk of disproportionate adverse impacts with the help of community-based committees. - Concerning women as a vulnerable identified group, there is a risk that the project might increase the workload for women, exposing them to an increase vulnerability. In this case, measures are explained in ESP5. - Regarding the no discrimination of vulnerable groups, the project has designed a process of allocating and distributing its benefits. The criteria for selecting project activities, beneficiaries and co-executor is explained in figures 11, 12 and 13 of the project document.
4. Human Rights	The project will follow a human rights-based approach, ensuring consistency with national and international legislation. To ensure consistency with the human rights principles of participation and inclusion, the project will support capacity building and the creation of an enabling environment for meaningful participation and inclusion.	

Checklist of environmental and social principles	No additional management plan is required for compliance	Management plan necessary to minimize negative impact or ensure positive impact
	This consists of the definition of roles and responsibilities of stakeholders, including Indigenous peoples and the principles of co-responsibility during the design and implementation of activities. During these workshops, the project will respect all opinions no matter what race, color, sex, language, nationality or social origin of the participants.	
5. Gender Equity and Women's Empowerment		The project seeks to improve gender equality and its activities encourage women's empowerment. However, there is an identified risk that the project could make women disproportionately vulnerable to negative social impacts such as increased workload, and at the same time, restricting their opportunities to participate. To avoid, minimized and/or mitigate this risk, the following measures will be conducted: Include greater participation and involvement of women in the processes of land use planning; • Involve women in capacity building activities by providing conditions consistent to their local realities (gender sensitive time management); • Seek equal representation of men and women in the project's seminars, workshops, training-of-trainers and other educational and awareness raising events of the project; • Further encourage and support participation of women in livelihoods options by selecting them as implementers of pilot projects • Support to livelihoods and access to credit and other financial instruments proposed by the project will consider women (both young and old) and facilitate access of women's organizations to these incentives;

Checklist of environmental and social principles	No additional management plan is required for compliance	Management plan necessary to minimize negative impact or ensure positive impact
		• Promote an equitable distribution between men and women in economic benefits arising from the project. • Engage women from women's organizations in monitoring and evaluation of pilot projects, and also in dissemination of good practices; The project team will update the report on the Identification of risks or the maintenance of gender inequalities. The project will follow the principles of the FAO´s Regional Strategy for Gender 2019-2023[48].
6. Core Labour Rights	The project is based on the national labor rights, which protect the interests of the employed. The project will be implemented in compliance with legislation including the Labour Code. No child labor nor forced labor is expected to result from this project. This project will promote the compliance with labor rights by giving the farmer the tools and knowledge for the implementation of organic farming and the use of local resources, adding value to their products and therefore increasing their sales and income. In addition, the project enhances the concept of organic farming throughout its activities. Organic farming is an activity that favors the creation of employment at a local level especially in marginal areas, where agricultural activity no longer stands on its own because it is not competitive in the market. Among its impacts are: the use of local	

[48] Estrategia Regional de Género 2019-2023: http://www.fao.org/3/ca4665es/CA4665ES.pdf

Checklist of environmental and social principles	No additional management plan is required for compliance	Management plan necessary to minimize negative impact or ensure positive impact
	resources, less dependence on inputs, greater job creation and greater added value, the generation of new knowledge, new job opportunities in areas like research, new marketing channels controlled by the producers themselves and new rents derived from landscape management and biodiversity conservation or agro- tourism. All this chain of good agro-ecological environmental practices will generate employment under healthy working conditions.	
7. Indigenous Peoples	There is no risk or adverse effects. The intervention will not affect the indigenous groups or territories. Ecuador in its Constitution of 2008 recognizes both, indigenous peoples' land rights and livelihoods, and the rights of nature. The Constitution's third part titled Rights, Duties, and Guarantees declares collective rights as they pertain to indigenous peoples. Article 84 states that the State shall recognize and guarantee indigenous peoples rights, in conformity with the Constitution, the law, human rights and collective rights.	
8. Involuntary Resettlement	There is no resettlement of communities in the project area. The project will not permanently or temporarily remove people from their homes or means of production/livelihood or restrict their access to their means of livelihood The proposal of component 1 is the creation of bio corridors that allow the interaction of ecological connectivity, sustainable productive landscapes, the association of biodiversity and landscape. • Ecological connectivity • Sustainable productive landscapes	

Checklist of environmental and social principles	No additional management plan is required for compliance	Management plan necessary to minimize negative impact or ensure positive impact
	• Associativity Sustainable forest management practices and conservation mechanism will be implemented in coordination with the community and beneficiaries. Component 2 focuses on the implementation of climate change adaptation measures among beneficiaries and improving their access to climate smart financing.	
9. Protection of Natural Habitats		Project activities would not involve unjustified conversion or degradation of critical natural habitats, including those that are (a) legally protected; (b) officially proposed for protection; (c) recognized by authoritative sources for their high conservation value, including as critical habitat. In order to comply with ESP 9, to avoid any risk of unjustified conversion or degradation of critical natural habitats, the project will apply the following measures: - Training farmers, beneficiaries and community on environmentally appropriate farming practices. Instruction in safe selection of practices and organic fertilizers, promotion of the concept of integrated pest management and good agricultural practices, besides of the emphatic discouragement of the use of persistent herbicides/ pesticides. This is also explained in ESP 12. - Provision of extension and training about land use /territorial planning and economic /ecological zoning, to sensitize farmers about avoiding unsustainable land use or land use change. - Talks with the beneficiaries of the Bio corridor to disseminate knowledge of the destination of the activities and the benefits of adapting to climate change.

Checklist of environmental and social principles	No additional management plan is required for compliance	Management plan necessary to minimize negative impact or ensure positive impact
		- Meetings with the beneficiaries that are within the Bio corridor area, determination of agreements and commitment actions for the conservation of the Bio corridor with sustainable activities. The project seeks to reduce the main sources of deforestation and degradation, rescuing natural spaces and habitats that previously existed and that are now necessary for the recovery of flora and fauna biodiversity in the sector. It also seeks to protect forests that provide multiple benefits to communities and production sectors. In component 1, the project seeks to improve the mechanism (furnace and mills) for the production of panela in order to reduce the use of wood as combustible material. Technification (modernization) reduces up to 60% of the wood needs for panela production. This measure helps to reduce the pressure on the remaining forests and the emission of greenhouse gases. In component 2 the project will promote sustainable agriculture and livestock practices such as the organic agriculture. Research is increasingly proving that organic farming provide several benefits for small farmers a) require few or no external agents, and b) use natural materials available in the region to produce high quality products and promote a complete systemic strategy for agriculture that is more diverse and resistant to adverse weather conditions, pests and diseases.
10. Conservation of Biological Diversity		The project will be implemented in a way that avoids any reduction or loss of biological diversity or the introduction of known invasive species. The project will not change a natural ecosystem to an agricultural unit with a reduced diversity of flora and fauna. On the contrary, the actions of the project will contribute to conserving forests and vegetation cover. The project will

Checklist of environmental and social principles	No additional management plan is required for compliance	Management plan necessary to minimize negative impact or ensure positive impact
		strengthen the protected areas with the creation of the bio corridors that will allow connectivity. In order to avoid any risk associated to the reduction of biological diversity, the project will strictly adhered to the biodiversity and ecosystem laws of figure 37 of the project document and to the Law of Seed, Agrobiodiversity and Sustainable Agriculture. In addicion, the project team will organize: Forest technical study of the area to implement reforestation activities. Technical study of adaptation measures to be implemented by farms Training for the beneficiaries of the next steps to follow for the reforested areas. Training of farmers on farms for the selection and implementation of good agricultural practices.
11. Climate Change	The project does not include activities that involve a significant increase in emissions of greenhouse gases or other climate change stressors. On the contrary, sustainable agricultural practices reduce the emission of greenhouse gases. Small-scale measures include labor, land use, efficient use of fertilizers, and use of deep-rooted crops and conversion of arable land in conservation areas, crop rotation and maintenance of terraces. As affirmed by Smith (Smith, 2007b, SEAE, 2006), organic farming can reduce CO2 emissions significantly as it is a permanent system of sustained production. For the energy saving involved in maintaining soil fertility through inputs internal (rotations, green fertilizers or legume crops), by the absence of the use of phytosanitary and synthetic fertilizers and the low levels of outsourcing in livestock feed due to the intensification and use of local resources. The efficiency of carbon capture in ecological production systems is 4.5 tons of CO2	

Checklist of environmental and social principles	No additional management plan is required for compliance	Management plan necessary to minimize negative impact or ensure positive impact
	per hectare, while in conventional production systems it is reduced to 2.3 tons of CO2 per hectare (Smith, 2004). Additionally, the project aims to strengthen local capacities in climate change by enforcing local capacities in the use of meteorological information provided by hydro-meteorological stations. The understanding of hydro meteorological information is essential for the development of local risk reduction strategies as for example the formulation and implementation of contingency and emergency plans and early warning systems. In addition, one of the project activities seeks to incorporate climate change into local planning tools (PDOTs) by developing EbA measures, which help to guarantee a sustainable local development. Nowadays local governments face incrementing costs because of natural disasters and climate change, because of delays and failures in the implementations of local programs and activities. The inclusion of EbA measures into local planning will provide a better understanding of the possible impacts of climate hazards on program and project activities, and will help to identify key sectors of intervention.	
12. Pollution Prevention and Resource Efficiency	The project does not include activities that will use large quantities of energy, water or other natural resources nor will it generate large quantities of residues, emissions and discharges. The project seeks to improve the mechanism (oven and mills) for panela production in order to reduce greenhouse gases emission and other	

Checklist of environmental and social principles	No additional management plan is required for compliance	Management plan necessary to minimize negative impact or ensure positive impact
	noxious gases for human health and vegetation. Nowadays, because of the lack of maintenance of the mills motors, which leads to failures in the combustion system, smoke is produced in the production of panela. In addition, in the evaporation process in the oven, bagasse is used which contributes to higher levels of pollutions and low resource efficiency. Because of the low efficiency of bagasse, people (producers) are forced to include other combustible materials, such as wood, tires and coal in the production process, which have an additional negative impact on the climate, environment and human health. The production process of panela causes the emissions of CO, SO2, NOx, CO2 and water vapor. The project will not promote the use of pesticides. Instead, it will promote sustainable pest management approaches such as Integrated Pest Management (IPM). Integrated Pest Management (IPM) reduce reliance on pesticides and avoid adverse impacts from pesticide use on the health and safety of farming communities, consumers and the environment.	
13. Public Health	The project does not include affectation to public health. Moreover supporting the use of efficient cooking systems for panela, as well as the promotion of family gardens, the project will contribute to reduce negative health impacts.	

Checklist of environmental and social principles	No additional management plan is required for compliance	Management plan necessary to minimize negative impact or ensure positive impact
14. Physical and Cultural Heritage	In the project area, any sites have structures with historical, cultural, artistic, or intangible forms of culture that could be affected in the execution of the project.	
15. Lands and Soil Conservation	The project will not cause degradation of the soil or reduce its agricultural suitability, indeed, it will have a positive impact on the preservation of soil and forests, in addition to enrichment with micronutrients due to reforestation and the following organic techniques for agricultural production: **Maintenance of vegetable covers and use of crop residues:** The soil serves as a physical and chemical support for the animals, plants and microorganisms that grow in it. It is composed of organic and mineral material and is permeable due to the existence of micro and macro pores that allow the existence of an aqueous solution and a gaseous atmosphere (Domínguez et al, 2002). The green fertilizer is intended to increase the microbial activity of the soil so it is little or no lignified materials (the young humus is rapidly evolving). **Rotations and alternatives of crop:** The rotation is the succession of crops on a same plot, thus a plant consuming nitrogen, it must happen another that accumulates it; a consumer of humus, another that produces it; those that leave the compact floor, those that leave it soft; and those with superficial roots, they must follow others of deep roots. Its immediate effect is the efficient use of soil nutrients, reduction of chemical fertilization. **Association of crops:** Crops mixed in the same plot, two or more plant species that complement each other, so that the interactions that	

Checklist of environmental and social principles	No additional management plan is required for compliance	Management plan necessary to minimize negative impact or ensure positive impact
	occur between them exert a stimulating effect on them. Land, space and water are always better used in associated crops than in monocultures. (Greater use of light and improves the microclimate, the risks of a poor harvest are reduced). Project activities will be guided by FAO´s Voluntary Guidelines for Sustainable Soil Management[49]	

Table 335: Mitigation mesures according to the 15 principles of the AF's ESP.

[49] FAO´s Voluntary Guidelines for Sustainable Soil Management[49] http://www.fao.org/global-soil-partnership/resources/highlights/detail/es/c/472458/

PART III: IMPLEMENTATION ARRANGEMENTS

A. Describe the arrangements for project / programme implementation.

426. The Ministry of Environment (MAE) is the national institution in charge of developing environmental policy and coordinating strategies, projects and programmes aimed at ecosystem conservation, climate change and the sustainable use of natural resources. The MAE defines the rules regarding adequate environmental quality and development based on the conservation and appropriate use of biodiversity and natural resource. MAE's role is to provide strategic insight and provide technical and political guidance on the project execution.

Implementation Modality

427. The project will be implemented over a four-year period, under the National Implementation modality, with CAF as the FA Implementing Agency (IA), the Food and Agriculture Organization (FAO) as Executing Agency Partner and the MAE as the co-executing entity.

Implementing Agency

428. As AF implementing agency, CAF is ultimately accountable and responsible for the delivery of results, subject to their certification by MAE, as main project partner. CAF shall provide project cycle management services as defined by the AF Council, that will include the following:

- Providing financial and audit services to the project
- Overseeing financial expenditures against project budgets,
- That activities including procurement and financial services are carried out in strict compliance with FA procedures,
- Ensuring that the reporting to FA is undertaken in line with the requirements and procedures,
- Facilitate project learning, exchange and outreach within the FA - CAF family,
- Contract the project mid-term and final evaluations and trigger additional reviews and/or evaluations as necessary and in consultation with the project counterparts.
- Undertaking the due diligence of the Executing Entity.

429. CAF will provide Project Assurance, supporting the Project Board Executive by carrying out objective and independent project oversight and monitoring functions.

Executing Entity

430. At the request of the Government of Ecuador, the Food and Agriculture Organization (FAO) will act as the Executing Entity for this project. FAO is a specialized agency of the United Nations that leads international efforts to defeat hunger. Its goal is to achieve food

security for all and make sure that people have regular access to enough high-quality food to lead active, healthy lives. With over 194 member states, FAO works in over 130 countries worldwide. FAO works to promote coherent approaches to sustainable land and water management. Its work is relevant to several dimensions of sustainable development, such as the governance and management of food production systems; the provision of essential ecosystem services; food security; human health; biodiversity conservation; and the mitigation of, and adaptation to, climate change. Since 1997, multidisciplinary teams organized by FAO have implemented some 150 projects to promote sustainable land and water management, addressing, for example, natural resource management, policy implementation through the delivery of appropriate tools and information, and capacity building at the local and national levels.

431. FAO will be responsible for the provision of technical assistance, execution of activities in the intervention area and day-to-day supervision and monitoring. FAO will be responsible for approving deliverables prior to their reporting to CAF and the AF. FAO will be also responsible for the financial and operational execution of the project, and will carry out procurement and contracting services according to its policies and procedures. In general, FAO will be responsible of the following tasks:

- Provide technical assistance in accordance with the project document, implementation plan, budgets and FAO standards and procedures;
- Provide technical guidance that ensures that the respective technical quality is applied in the project activities;
- Responsible for the AF ESP compliance`s supervision in all project activities and USP, reporting, follow up, assessment and mitigation.
- Carry out at least one supervision mission per year
- Carry out M&E activities
- Administration of project funds according to FAO standards

Project Co-Executors / Partners

432. The project partners are the MAE, parish governments of Manuel Cornejo Astorga (Tandapi), Aloag, El Chaupi, Palo Quemado, and Las Pampas, the municipal government of Sigchos, MAG, INAMHI, SENAGUA and CELEC-EP. Complementary collaboration agreements will be signed with the provincial governments of Cotopaxi and Pichincha, HIDROTOAPI and relevant local organizations.

433. The *Steering Committee* (ST) is the project coordination and decision-making body. The ST responsibility is to supervise strategically that the project activities lead to the expected results, as defined in the project document. The ST will meet semiannually to approve the Annual Workplan (POA) and Procurement Plan (PAC)o technical and financial progress reports, project deliverables as well as to authorize any budget modification. In addition, it could arbitrate any conflict that may arise and will be responsible for the general evaluation of the project. The ST can be extraordinarily called by the President, at the request of the individual members. In addition, it will approve the appointment and responsibilities of the National

Coordinator and any delegation of its Project Assurance responsibilities. The ST will play a critical role in facilitating inter-ministerial coordination, project monitoring and evaluation.

434. The ST will consist of the following members:

- The President, who will chair the ST. This role will be filled by the Minister of Environment or his/her representative.
- A representative of the Implementing Agency, who will provide guidance regarding the technical progress of the project. This role will be filled by CAF.
- A representative of the co-executors: This role will be filled by SENAGUA. which is the national entity responsible of the water management and governance, for this project its role will be to provide technical insight and support for project activities related to water use.

FAO will play the role of Secretary of the Steering Committee. The Ministry of the Environment, with the support of FAO as Executing Entity, will call the meetings.

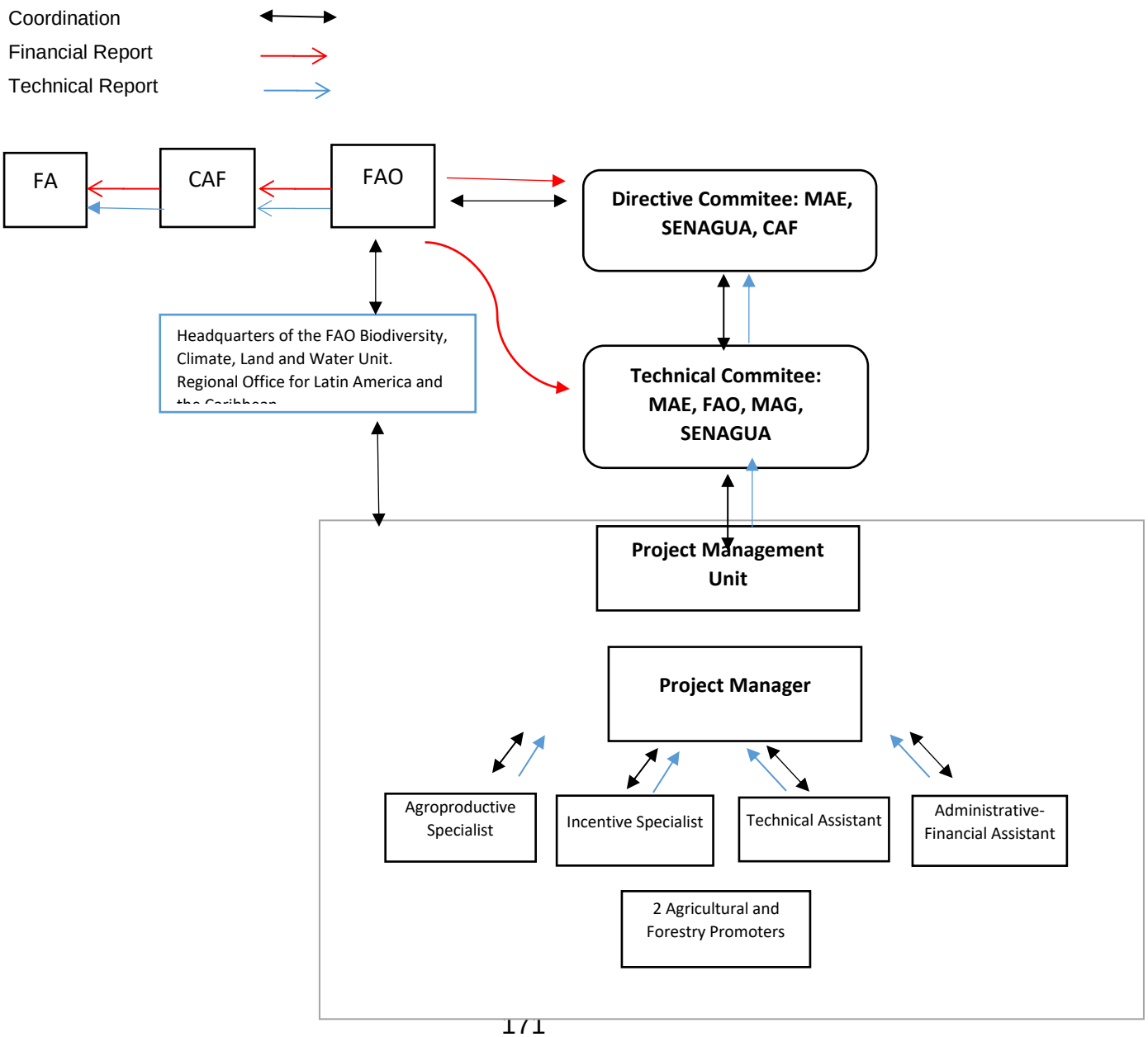
435. The *Technical Committee* (TC) of the project is the body for technical and operational coordination, responsible for technical decisions and providing guidelines and supervision for the project team. The TC has the following functions: (i) directing the project according with the work plan (POA / PAC); (ii) achieve results and products in a timely manner; and (iii) effectively and efficiently use the financial resources allocated according to the Project Document and Implementation Plan; (iv) planning of project activities, advice and accompaniment to the ST; (v) advising the ST on other ongoing and planned activities, facilitating cooperation between the project and other programs, projects and initiatives.

436. The TC may also be involved in the technical evaluation of the project progress and its products, and in the eventual development of an agreed adjustment plan,, if necessary.The CT will advise on ensuring coordination between the project and other related institutions such as the GAD, communities representatives, CELEC and MAG. The Ministry of Environment – MAE, the Ministry of Agriculture and Livestock – MAG, the National Secretariat of Water – SENAGUA and the Food and Agriculture Organization – FAO will be part of the TC.

437. The *Project Management Unit (PMU)* The project team will closely coordinate the activities with the technical focal points designated by CAF, MAE, SENAGUA, MAG and other local institutions to support activities, technical definitions, approval of terms of reference and products. At the local level, the participation of local technicians, producers associations as well as of the dependencies of national institutions of MAG, SENAGUA, INAMHI and other relevant actors will be encouraged.

438. The PMU will be responsible for the compliance, assessment and monitoring of the AF ESP, for all project activities and USPs and according with the ESMP. These activities are included as part of their job duties and responsibilities.

439. The PMU will be located in Quito, Ecuador. The project team must make field visits according to their monthly planning and execution of activities. Missions to the territory and communities for on-site training and workshops will be fundamental. Part of the technical team will have a permanent presence in the intervention areas of the project. The project implementation arrangements will be based on the following scheme:



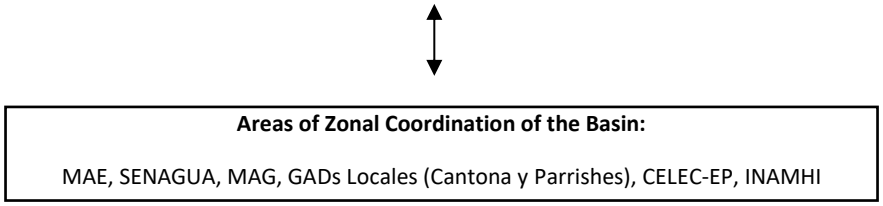


Figure 49: Organizational structure of the project

B. Describe the measures for financial and project risk management.

440. The following risk have been identified for a successful project implementation. In the early stages of the project, the analysis will be updated and constantly monitored:

Project risks					
Description	**Type[50]**	**Impact & Probability level[51]**	**Mitigation Measures**	**Respon sible**	**Status[52]**
Change of central government in Ecuador. The new president took office in 2018[53], delays were caused in the development of the final project proposal.	Political	P = 5 I = 3	Present the project to new authorities in MAE	CAF	Reducing
Change of municipal government in Ecuador. The new authorities will take office in 2019[54].	Political	P = 5 I = 3	Present the project to new authorities	MAE and CAF	No change
Change of in regulatory or legal stipulations might require the adjustments of critical project components for their compliance.	Financial	P = 5 I = 3	Present the project to new authorities; to promote formal agreements	MAE and CAF	No change
Grant not being delivered and/or not being delivered on time	Financial	P = 2 I = 3	CAF's cash flow would allow to respond to	MAE and CAF	Increasing

[50] Environmental, Financial, Operational, Organizational, Political, Regulatory, Strategic, Other
[51] 1 = low / 5 = high.
[52] Over, reducing, increasing, no change.
[53] During the first year of project implementation.
[54] In the mid-term of Project execution.

Project risks					
Description	**Type[50]**	**Impact & Probability level[51]**	**Mitigation Measures**	**Responsible**	**Status[52]**
mainly with local inclement weather problems			disbursements in case of delays. National funds		
Increase in budget due to costs miscalculations, and/or due to overprices during project implementation.	Financial	P = 2 I = 3	Agreement signed with local counterparts to guarantee the project execution.	MAE and CAF	No change
Effect of La Niña in precipitation and local weather conditions[55].	Environmental	P = 3 I = 3	Monitor information and alerts in national meteorological entities, NOAA, and World Meteorological Organization	CAF	Increasing
The project intends to include a variety of stakeholders that need to be coordinated and engaged. There is a risk that changes in governments or management members, as well as conflicting interests put the project execution at risk.	Organizational	P = 3 I = 3	Engage stakeholder and key actors early on; provide information on project activities and clarify concrete benefits for each stakeholder;	MAE, CAF, FAO and Project Unit	Increasing
Baseline studies are not up to date (climate change information dynamics)	Operational	P = 2 I = 3	Adjustment of existing designs, incorporating the climate change factor; to promote synergies with other climate change initiatives	MAE	Increasing
Lack of understanding of the project, and hence opposition from the local inhabitants.	Social	P = 3 I = 3	Effective communication strategy (C3) contemplates socialization of the	MAE, FAOProject Unit	No change

[55] In Ecuador, La Niña produces dryer conditions. Currently, La Niña is favoured to develop during August - October 2016, with about a 55-60% chance of La Niña during the fall and winter 2016-2017 (NPC, 2016).

Project risks					
Description	**Type[50]**	**Impact & Probability level[51]**	**Mitigation Measures**	**Respon sible**	**Status[52]**
			project with the local communities.		

Table 346: Details project risks

C. Describe the measures for environmental and social risk management, in line with the Environmental and Social Policy of the Adaptation Fund.

441. The project presents a categorization B, which corresponds to a moderate risk, which can be identified in the risk assessment included in **Error! Reference source not found.**

442. To ensure that risks are properly assessed and followed the project management and governance (Section III.A), Monitoring and Evaluation (Section III.D) fully take the management of environmental and social risks into account. In addition, an Environmental and Social Management System will be put in place to ensure fully compliance with the Adaptation Fund's ESP.

443. Annex 7 contains the Project Activities, Risk identification and categorization, environmental and social mitigation program (ESMP) which includes also the Environmental and Social Risk Identification Mechanism for Unidentified sub-projects (USP). In addition, it includes the Grievance mechanism with the procedures for dispute settlement, cases of non-compliance, complaints, the use of the stakeholders' response mechanism and the involvement of relevant stakeholders and the disclosure of information.

444. For ESPM and USP compliance, the monitoring, evaluation and oversight requirements (further detailed in Annex 7) will be included in the project as part of the bi-annually monitoring of outputs and outcomes. As part of this process, the PMU will be responsible for the process and will evaluate to prior determinate if an E&S principle will be triggered by an USP. If this is the case, the ESP assessment will be carried out. A final follow up and assessment will be made to determine whether the measures are mitigating the risks and impacts. Bi-annually, an E&S matrix will be attached to the PPR, this report will include a section on the state of execution of the mitigation plan, as well as the corrective measures, if necessary.

D. Describe the monitoring and evaluation arrangements and provide a budgeted M&E plan.

445. Monitoring and evaluation activities will be undertaken in compliance with standard CAF requirements as agreed with the Adaptation Fund. It is expected to prepare the annual Adaptation Fund Project Performance Reports that include the Adaptation Fund Results Tracker. Monitoring and evaluation of progress in achieving project results and objectives will be done based on the targets and indicators established in the Project Results Framework. The project Monitoring and Evaluation Plan has been budgeted at USD 100,000 (see Table 35Table 10). The monitoring and evaluation system will also facilitate learning and replication of project results and lessons in relation to integrated management of natural resources.

446. In addition to these mandatory CAF and AF monitoring and evaluation requirements, FAO as an Execution Entity will implement regular M&E activities to support project-level adaptive management

447. The monitoring and evaluation roles and responsibilities described in the Monitoring and Evaluation Plan (Table 35) will be undertaken through: (i) day-to-day monitoring and project progress supervision missions ; (ii) technical monitoring of project indicators (iii) specific monitoring plans for implementation of good practices (component 2); (iv) mid-term and final evaluations (independent consultants and CAF Evaluation Office); and (v) monitoring and supervision missions (MAE, FAO and FAO).

448. The day-to-day monitoring of the Project implementation will be the responsibility of the PMU and will be driven by the preparation and implementation of an AWP. The preparation of the AWP will be approved by the ST. To monitor project outputs and outcomes, specific indicators have been established in the Project Results Framework (see annex 7). The Project Results Framework indicators and means of verification will be applied to monitor both project performance and impact. Following CAF-FAO monitoring procedures and progress reporting formats, data collected will be sufficiently detailed that can track specific outputs and outcomes, and flag project risks early on.

449. The CAF and FAO Country Offices in Ecuador will retain all M&E records for this project for up to seven years after project financial closure in order to support ex-post evaluations that might be undertaken. There will be an independent mid-term review and a terminal evaluation to assess progress and lessons coordinated by CAF.

450. The budgeted monitoring and evaluation plan is presented as follows:

Monitoring and Evaluation action	Primary responsibility	Indicative cost 56 (USD)	Key indicator	Time frame
1. Inception Workshop	CAF	20,000	Local stakeholder participation all components	Within two months of project document signature
2. Inception Report	Project Manager	None	NA	Within two weeks of inception workshop
3. Monitoring progress of project indicators	Monitoring and Evaluation specialist	None	Gender analyses C1 y C2	Measured biannually
4. Quarterly and annual reports (PPR)	Project Manager CAF FAO	None	Gender analyses # number of ha under conservation for all components	PPR submitted every year (no later than two months after the end of the reporting year). First PPR must be submitted one year after the start of project implementation (date of inception workshop). The last PPR shall be submitted no later than two months after the end of the reporting year.
5. E&S Monitoring and Evaluation of project activities and USP	Project Management Unit - PMU	None	E&S Bi-annual Report	The E&S report will be presented to monitor and evaluate the implementation of the mitigation plan, for high and moderate risk. If there is the case, a USP E&S assessment will be included with a mitigation plan.
6. Oversight missions	CAF	None57	Visita a organizaciones de mujeres involucradas en el C1 y C2	Annually
7. Audit	CAF	25,000	NA	Annually
8. Independent mid-term review	CAF Project team	15,000	Farming plans elaborated C1 and C2	Year 2

9. Independent terminal evaluation	CAF Project team	20,000	Farming Plans Implemented which at least 50% of women participate all components	Year 4. Three months before project closure
10. Translation of mid-term review and terminal evaluation reports into English	CAF	5,000	NA	
11. Final project report	Project team CAF	None	Initiatives systematization all components	One month before project closure
12. Project Board closure meeting	CAF	15,000	Number of communities participating	Last month of project execution
Total indicative cost		100,000		

Table 357: Budgeted monitoring and evaluation plan.

The project will be monitored through the following M& E activities. The M& E budget is provided in the table above.

Inception Workshop:

451. A Project Inception Workshop will be held within the first 2 months of project start. It will involve the participation with those with assigned roles in the project (MAE MAG, SENAGUA, INAMHI, CAF, FAO, GADs) and the national and local stakeholdersThe Inception Workshop is crucial for building ownership ofthe project results and to plan the first year annual work plan. The coordination of the workshop will consider gender, participation of co-executors and vulnerable groups.

The Inception Workshop should address a number of key issues including:

- Assist all partners to fully understand and take ownership of the project.

[56] Does not include personnel.
[57] Charged to the project cycle management fee.

- Review and agree on the indicators, targets and their means of verification, and review assumptions and risks with gender considerations.
- Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.
- Discuss financial reporting procedures and obligations, and arrangements for annual audit.
- Plan and schedule Project Board meetings. Roles and responsibilities of all project organisation structures should be clarified and meetings planned. The first Project Board meeting should be held within the first 12 months following the inception workshop.

Annually:

452. Monitoring of project indicators: This key report is prepared by the Project Manager to inform progress since project start and in particular for the previous reporting period. The Monitoring progress of project indicators includes, but is not limited to, reporting on the following: Project outputs delivered per project outcome (annual); Lesson learned/good practice; Gender analyze; Risk and adaptive management.

453. Biannual and annual reports (PPR): Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative). The PPR is submitted every year (no later than two months after the end of the reporting year). The first PPR must be submitted one year after the start of project implementation (date of inception workshop). The last PPR shall be submitted no later than two months after the end of the reporting year. Togheter with the PPR, the E&S report will be presented to monitor and evaluate the implementation of the mitigation plan, for high and moderate risk principles, which will include a USP E&S assessment and mitigation plan if there is the case.

Oversight missions, periodic monitoring through site visits:

454. FAO and MAE will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess project progress on site Other members of the Project Board may also join these visits.

Mid-term evaluation:

455. The project will undergo an independent Mid-Term Evaluation at the mid-point of project implementation The Mid-Term Evaluation will determine progress toward the outcomes and will identify any correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as

recommendations for enhanced implementation during the second half of the project's term. The coordination, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term evaluation will be prepared by the FAO and CAF based on guidance from AF.

Final evaluation:

456. An independent Final Evaluation will take place three months prior to the final Project Board meeting and will be undertaken in accordance with CAF and FA guidance. The final evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals.

457. During the last three months, the project team will prepare the Project Terminal Report. This comprehensive report will summarize the results achieved (objectives, outcomes, outputs), lessons learned, problems met and areas where results may not have been achieved. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project's results.

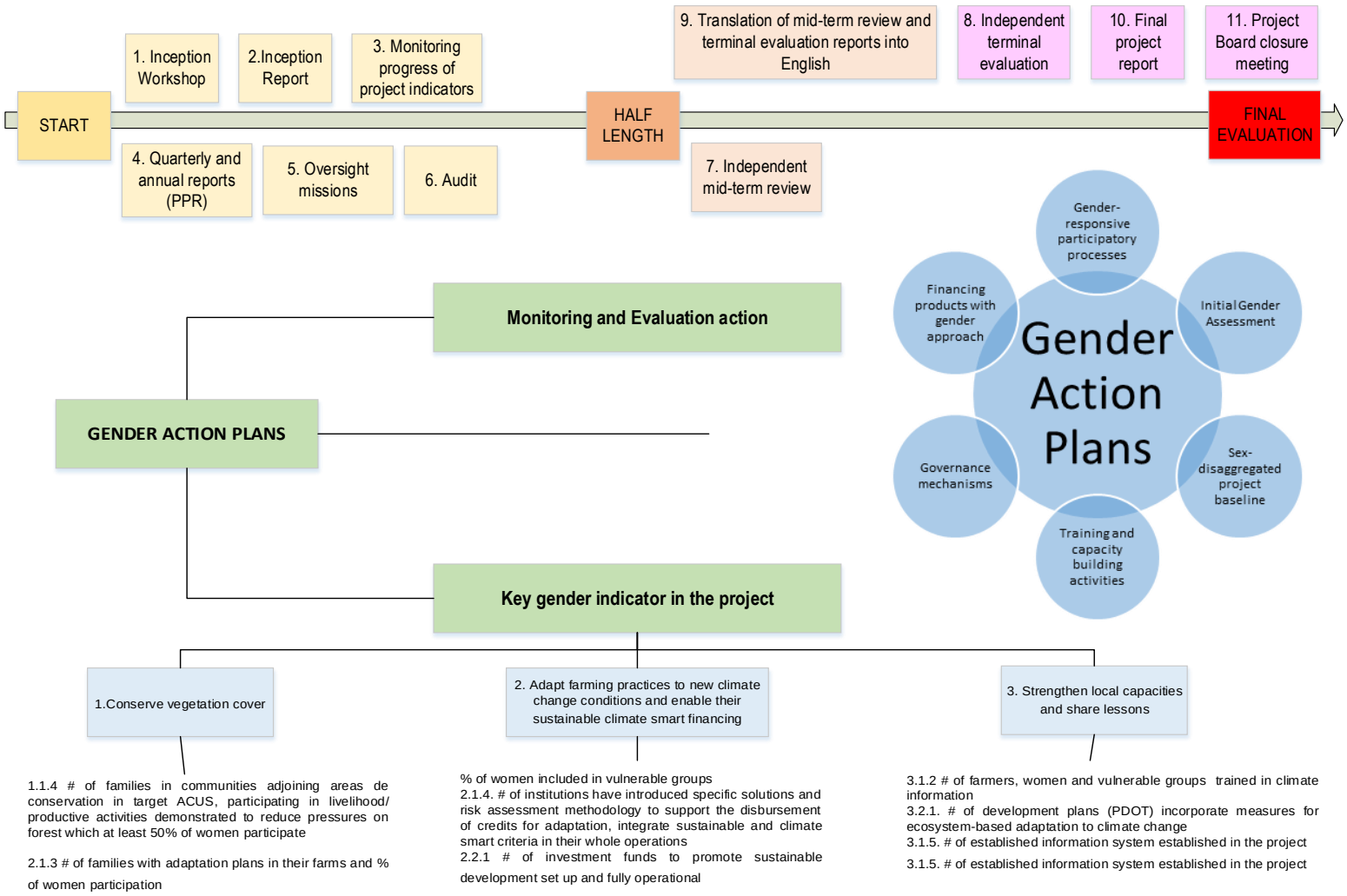


Figure 50. Monitoring and evaluation concept includes gender keys

E. Include a results framework for the project proposal, including milestones, targets and indicators.

Project Program Component	**Component 1: At least 230,000 ha of native vegetation is conserved to reduce the impact of climate change on the hydrological cycle under integrated watershed management**				
Expected Outcome	**Indicator**	**Baseline**	**Target by project end**	**Sources of verification**	**Assumptions**
C1.1. 1,000 ha of native vegetation is conserved by sustainable forest management and conservation mechanisms.	1.1.1 # of ha of forest conserved in the Bio-corridor	The forest and conservation areas of the Río Blanco upper basin have outdated management plans.	Establishment of functional conservation areas as part of the Toachi-Pilaton corridor	Ha under conservation categories with formal agreements. Satellite images of high resolution to monitor conservation areas.	The economic activity and the area of use increases. Farm plans and formal protection agreements are required.
			Bio-corridor working with at least 1,000 ha of conservation to regulate the hydrological cycle.	Administrative records of different project actors.	All the relevant actors are willing to cooperate and coordinate among them.
	1.1.2 # of Decentralized Governments (GAD) with planning, regulatory and normative instruments for ACUS	-0/6 target GADs have Territorial Land Use Plans (TLUP) that incorporate specific provisions to climate change effects -0/6 J6GADs in project landscapes have or apply regulatory or normative instruments in relation to	6/6 GADs in target bio-corridor with TLUP that incorporate specific provisions for Bio-corridor of conservation, ACUS and climate change adaptation harmonized with the national norm, with associated budgetary provisions.	Territorial Land Use Plans of the target provinces (PDOT)	The GADs are willing and incentivized by MAE to participate in the activity strengthening their management capacities in line with the project's objective, planned outcomes and outputs.

		conservation and ACUS declaration			
	1.1.3 Percentage (%) reduction of wood used for panela production:	To be determined in the first year of the project	Improve sustainable production alternatives that reduce pressure on forests	Farm's zoning and plan elaboration.	The communities in the Rio Blanco upper watershed are interested in participating.
			30% of reduction of current use of wood	Technical folder (IBA).	Financing mechanisms for efficient knils will be implemented and are productive, inputs and equipment are available.
				# of efficient knils installed accoridng to administrative records of the project, financing institutions and servcie providers;	
				Governance analysis developed to identify relations among actors and avoid possible conflicts	Monitoring activities provide measurable results to verify baseline and enhancements introduced by the project.
	1.1.4 # of families in communities adjoining areas de conservation in target ACUS, participating in livelihood/productive activities demonstrated to reduce pressures on forest which at least 50% of women participate	To be determined, once target families are identified.	- At least 178 families participate in sustainable productive activities.	Field inspections in target communities	If to many target commuities are joining the project, spot-sampling methodology will be applied.
		No planning is made for farms or the river basin.	- At least one technology transfer agreement signed with universities.	Questionnaires and/or focus groups to verify links of production and reductions in pressures on forest	National universities are interested and can hence be engaged in joining the project

	1.1.5. # of properly performing stations located in the river basin.	Four stations partially working.	7 hydro-meteorological stations providing climatic data in a regular bases and located accordingly to technical criteria by INAMHI	Previously existing equipment improved and working properly.	No price increases for existing spare parts or identified equipment will occur.
				Hydro-meteorological monitoring system working correctly.	
				Data reported by hydro-meteorological stations.	
C1.2. At least 230,000 ha of native vegetation is conserved to reduce the impact of climate change on the hydrological cycle under integrated watershed management	2.1.1 Percentage of reduction in the use of forest wood for productive activities in the Upper and Middle Basin of the Toachi River	From the concept note 3 trees per month are being used for firewood.	30% of reduction of current use of wood for productive activities in the Upper and Middle Basin of the Toachi River through promoting technology change and improvement of the production process of the panela production	Farm's zoning and plan elaboration.	The economic activity and the area of use increases. Farm plans and formal protection agreements are required.
			Governance analysis performed	Technical folder (IBA).	Technical folder are available for all actors.
				# of farms that have experienced technology change/transfer.	All the relevant actors are willing to cooperate and coordinate among them.
				Governance analysis developed to identify relations among actors and avoid possible conflicts	
	2.1.2 # of ha of priority conservation areas maintenance through the creation of the	Toachi-Pilaton and Sarapullo protected forest already exist.	230,000ha protected in the watershed that includes ACUS, GADs areas, protected forests.	# of acres under conservation categories through formal agreements.	Administrative records and satelite image will be available for verification.
				# of ha recovered	

	Toachi Pilaton Bio-corridor.			Updated management plan.	
	2.1.3 # of families with adaptation plans in their farms and % of women participation	There are 0 farm plans in the project area developed with families and communities	At least 178 family farms including adaptation to climate change measures within their operation and with at least 50% of women participation	# of farm and management plans developed, verified by administrative records of the project. Inventory of farms with adaptation plans given to the management project unit.	Communities are willing to engage in the project's activities.
	2.1.4 Ratings of Management Effectiveness Tracking Tool and PGOA	Average total METT score in Illinizas PAs is 50 out of a possible 100	Reach an average total score of PAs: 70 out of a possible 100	METT evaluation carried out by the project	n/a
		PGOA developed	PGOA by 60% implemented in Illinizas	PGOA report	The project team will verify the implementation of the PGOA.
	2.1.5 # and quality of control points in wildlife and forest traffic	There is one control point in Tandapi.	-one additional control point implemented -Tandapi control point strengthened	Audit and monitoring report; project adminsitrative records Training and participants' list Statistics of controls made in both points	The respective authorities will comply with their initial statement of engaging with the project.
Project / Program Components	**Component 2. Adapt farming practices to new climate change conditions enable their sustainable climate smart financing**				
Expected Outcomes	**Indicator**	**Baseline**	**Targets by project end**	**Sources of verification**	**Assumptions**
C2.1. Sustainable	2.1.1. # of ha of pasture and # of ha of crops	Application of sustainable	At least 250 ha of pasture and 250 ha of crops	Inspection report of MAG officials.	Partners document gender of applicants/participants/ clients

farming practices and livestock adjusted to local realities are being introduced and implemented with assistance of financing mechanisms for adaptation measures	apply sustainable farming practices.	farming practices is non existent or sporadic at best.	apply sustainable farming practices and	Adminsitrative records of project partners for sugar cane, mortiño and naranjilla, livestock describing men and women participation	
	2.1.2 % of women included in vulnerable groups	Number of women dedicated to agricultural practices	50% women and 50% men including also vulnerable groups.	Application requests for implementation of sustainable practices.	Goups of women well informed about this initiative and willing to participate
				Adminsitrative records of project partners such as training or finance providers.	Partners document gender of applicants/participants/ clients
				Report of the selected farmers to be included in the project	Promotinon of women participation coming from GAD´s
	2.1.3 # of panela producers that implement better technology to decrease use of firewood.	0 efficient knils are being used in the project area	At least 10 artisanal panela producers applying best available technology (BAT)	Invoices with description of the machinery	Partners document gender of applicants/participants/ clients
				Monitoring report of the project/ adminsitrative records of partners and suppliers	
	2.1.4. # of institutions have introduced specific solutions and risk assessment methodology to support the disbursement of credits for adaptation, integrate sustainable and climate smart criteria in their whole operations	0 institutions in the project area has up-to-date smart-lending methodologies or green inclusive finance products	2 financial institutions incorporated into their business operations financial sustainability issues, including climate smart lending methodology and tools.	Climate and Environmental risk assessment reports, inlcuding operational audit report	Participation of financial institutions that show first steps towards sustainability issues
			2 institutions have introduced specific EbA-focused lending products	Climate and Environmental risk assessment reports, inlcuding loan portfolio reports	

			2 institutions have trained their personnel on sustainability topics, including EbA and Climate Change	Review of training materials and participants' lists	
C2.2 At least 1 long term financing mechanisms has been piloted or introduced	2.2.1 # of investment funds to promote sustainable development set up and fully operational 2.2.2 Assets of the investment fund in USD	No investment fund for sustainable development is active in the project area and hence has no assets	The investment Fund for the care of the upper basin of Río Blanco sustainable development is active an A total of USD 462,314 in assets has been generated	Constitutional documents of the fund; Audited financial statement for the period 2019-2021	The Toachi-Pilatón hydroelectric plant in full operation since 2019
Project / Program Components	**Component 3. Strengthen local capacities and share lessons**				
Expected Outcomes	**Indicator**	**Baseline**	**Targets by project end**	**Sources of verification**	**Assumptions**
C3 Local population and parish governments with increased capacity to implement climate change adaptation measures.	3.1.1 # of GADs trained to use meteorological information generated by meteorological stations currently installed.	0 GADs trained	6 GADs being trained to take care and use meteorological information generated by meteorological stations currently installed.	Training and participants' list	Integration of captured data by meteorological stations in a central point.
	3.1.2 # of farmers, women and vulnerable groups trained in climate information	0 farmers from 6 parishes have been trained in use of climate information	At least 500 families trained in the use of climate date, with at least 55% women's participation	Training and participants' list	Storage and processing data to make sure is understandable for the population and other stakeholders.
	3.2.1. # of development plans (PDOT) incorporate measures for ecosystem-based adaptation to climate change	0 PDOT	6 GADs PDOTs incorporate measures for ecosystem-based adaptation to climate change.	Development and territorial planning plans published on the website of the parish GAD.	Elaboration of development and territorial planning plans on a regular basis.

	3.3.1 # of communication, education knowledge transfer and replication events organized	0 events carried out	12 events over the liftime of the project carried out	Events' participants' list	Technological platform available for training and communication processes
	3.2.1 # of training provided to financial institutions.	0 institutions trained	At least 6 trainings provided on adaptation finance and 6 training for climate risk in two financial institution	Training and participants' list	Financial institutions have been identified and engaged.
	3.2.2 # of demonstration farms established	0 demonstration farms in project area	At least 2 demonstration farms established	Reports on demonstration farm planning and implementation	Suitable plots by public or provate actors identfied
	3.2.3 # of training events on EbA carried out	0 raining events on EbA carried out	At least 12 training events carried out in 6 parishs with at least 50% women participation	Workshop participants' list	Training materials have been developed in a modular approach
	3.1.5. # of established information system established in the project	0 technological platforms implemented by Ministry of Environment.	At least 1 information platform collecting lessons learnt by the project and supporting knowledge sharing	Continue access and availability of technological platform for training and communication, or search data and information.	

F. Demonstrate how the project aligns with the Results Framework of the Adaptation Fund

Project Objective(s)	Project Objective Indicator(s)	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
To strengthen the adaptive capacity of the local population in the Río Blanco water system	Number of people (men and women) with improved adaptive capacity [target 2600 people]	Outcome 2: Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses	2. Capacity of staff to respond to, and mitigate impacts of, climate-related events from targeted institutions increased	120,000
		Outcome 3: Strengthened awareness and ownership	3.1. Percentage of targeted population aware of	160,000

		of adaptation and climate risk reduction processes at local level	predicted adverse impacts of climate change, and of appropriate responses	
		Outcome 5: Increased ecosystem resilience in response to climate change and variability-induced stress	5.1. Number of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type and scale)	475,000
		Outcome 6: Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas	6.1 Percentage of households and communities having more secure access to livelihood assets	110,000
Outcome 1. At least 230,000 ha of native vegetation is conserved to reduce the impact of climate change on the watershed´s hydrological cycle.	Surface (ha) under improved management. [target 230,000 ha]	Output 5: Vulnerable ecosystem services and natural resource assets strengthened in response to climate change impacts, including variability	5.1. Number of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type and scale)	950,000
Outcome 2. At least 500 ha of agriculture land apply sustainable farming practices appropriate to the foreseen impacts of climate change	Production area (ha) under improved management [target 500 ha] Number of people (men and women) who implement sustainable farming practices [target >300]	Output 6: Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	6.1.1. Number and type of adaptation assets (tangible and intangible) created or strengthened in support of individual or community livelihood strategies	840,000
Outcome 3. Local population and parish governments with increased capacity to implement climate change adaptation measures.	Number of strengthened local development plans [target 6] Number of staff (men and women) of local governments and pertinent entities trained on adaptation to climate change [target >25]	Output 2: Strengthened capacity of national and subnational centres and networks to respond rapidly to extreme weather events	2.1.1. Number of staff trained to respond to, and mitigate impacts of, climate-related events (by gender) 2.1.2 Number of targeted institutions with increased capacity to minimize exposure to climate variability risks (by type, sector and scale)	400.000

	Number of people (men and women) who have participated in awareness activities and events. [to be defines] Number of visitors to the project´s website [to be defined]			

G. Include a detailed budget with budget notes, a budget on the Implementing Entity management fee use, and an explanation and a breakdown of the execution costs.

Output	Responsible entity	Canton / Parrish	Budget description	Year 1	Year 2	Year 3	Year 4	Total	Budget note	Details
1. 1,000 ha of native vegetation is conserved by sustainable forest management and conservation mechanisms.	MAE	All cantons & parishes	Contractual services company (ACUS management plan-conservation bio-corridor)	46,500				**46,500**	1.1	Contractual services company for the establishment of functional conservation areas as part of the Toachi Pilaton Basin Bio-corridor, the consultancy includes: Technical, biological and zoning file studies; ACUS Management Plan of Conservation Bio-corridor (MPCB).
	MAE	All cantons & parishes	Local consultants (Financial and operational sustainability strategy)		23,333	23,333	23,333	**70,000**	1.2	Local consultants for the Financial and Operational Sustainability Strategy according with the investment fund;
	MAE	All cantons & parishes	Contractual services individual (Management	5,375	5375	5375	5375	**21,500**	1.3	Contractual services individual for implementing, monitoring the Biocorredor Management Model

			and operation model)							
	MAE	All cantons	Contractual services company (Increases in # of Decentralized Governments (GAD) with planning, regulatory and normative instruments for ACUS)	3,500	3,500	3,500	3,500	**14,000**	1.4	In support of the Increases in # of Decentralized Governments (GAD) with planning, regulatory and normative instruments for ACUS that includes: the joint identification (PA authorities and GADs) of key habitats, restrictions and monitoring programs, and agreements for their implementation; inclusion in land-use planning processes of specific standards and practices for protecting forest and integrated watershed management; and Municipal ordinances on conservation, land use practices, and ACUS
	MAE	All parishes	Equipment and furniture (Strengthen incentive systems for set-asides on private and community lands based ACUS and technology change)	62500	62500	62500	37500	**225,000**	1.5	Strengthen incentive systems for set-asides on private and community lands based ACUS
	MAE	All cantons	Local consultants (Municipal PAs gazetted, covering 1,000ha, in buffer-zones and corridors identified as critical for water hydrological cycle)	3,000	3,000	3,000	3,000	**12,000**	1.6	Technicians in monitoring and supporting the Municipal PAs gazetted, covering 1,000ha, in buffer-zones and corridors identified as critical for water hydrological cycle.
	MAE	All parishes	Equipment and furniture (Promotion of habitat and connectivity-		20000	20000	20000	**60,000**	1.7	Equipment for the promotion of habitat and connectivity-friendly production options and programs for reduction of human/wildlife conflicts

			friendly production options)							in association with the Ministry of Agriculture
	MAE	All cantons & parishes	Contractual services individual (Increases in # families in communities adjoining conservation areas in target ACUS which at least 50% of women participation)		667	8667	8666	**18,000**	1.8	Technicians in support the increases in # families in communities adjoining conservation areas in target ACUS, participating in livelihood /´productive activities demonstrated to reduce pressures on forest which at least 50% of women participation
	MAE	All parishes	Equipment and furniture (Strengthening of the hydro-meteorological monitoring system in the Toachi-Pilaton river basin.)		8000	25000		**8,000**	1.9	Equipment for strengthening of the hydro-meteorological monitoring system in the Toachi-Pilaton river basin that includes maintenance of hydro-meteorological stations
			Subtotal					**500,000**		
2. Improved management of existing protected forests and private conservation areas (ca. 230,000 ha)	MAE	All parishes	Contractual services individual (Reduction in the use of forest wood for productive activities in the Upper and Middle Basin)	17,875	17875	17875	17875	**71,500**	2.1	Contractual services individual in support of the target: reduction in the use of forest wood for productive activities in the Upper and Middle Basin of the Toachi and Pilaton Rivers (Landscape Las Pampas and Palo Quemado), through technology change in the process of the panela production, that includes planning, assessment and monitoring of the process
	MAE	All parishes	Equipment and furniture (Technology change (ovens change to promote efficiency in the	43,720	43,720	43,720	43,840	**175,000**	2.2	Equipment and furniture such as technology change (ovens change to promote efficiency in the production of panela); forest planning and productive alternatives

			production of panela)							
	MAE	All cantons	Contractual services company (Planning and zoning of the river basin with a participatory and inclusive approach. Promote dialogue, coordination and technical support at local level)	10,333	10,333	10,333		**31,000**	2.3	Planning and zoning of the river basin with a participatory and inclusive approach. Promote dialogue, coordination and technical support at local level and improvement of the protector forest.
	MAE	All parishes	Contractual services individual (Management plan of the protector forest, including ravine and shore protection activities.)		10000	10000	5000	**25,000**	2.4	Implementation of Management Plan of the protector forest, including ravine and shore protection activities.
	MAE	All parishes	Contractual services individual (Train farmers in conservation practices and climate change)	4,000	4,000	4,000	4,000	**16,000**	2.5	Increase in the process of planning and zoning of farms in which at least 50% of women participate
	MAE	All cantons & parishes	Equipment and furniture (Increases in ratings of Management Effectiveness Tracking Tool and PGOA)	15,000	15,000	15,000	15,000	**60,000**	2.6	Equipment and furniture relationships with increases in ratings of Management Effectiveness Tracking Tool and PGOA

	MAE	All cantons	Equipment and furniture (Increases in control capacities in wildlife and forest traffic)	35,750	35,750			**71,500**	2.7	Increases in control capacities in wildlife and forest traffic that includes: Equipment for environmental control mainly forest and wildlife with supporting UPMA; Strengthen Tandapi control point; Install a control point in las Pampas, equipment in coordination with the Police; and Monitoring system, newsletter and decentralization of information.
			Subtotal					**450,000**		
3. 250 ha of pasture and 250 ha of crops apply sustainable farming practices	MAE	All cantons & parishes	Contractual services individual	10,000	15,000			**25,000**	3.1	Building of the team: Selection of experts in sustainable agricultural management and climate-smart livestock; Incorporation of an industrial technician with technical background to identify options of improvement in the technology for the panela producers; Field visits by specialists to collect information on the type of crop, microclimate, vulnerabilities and resilience; Documentation: Definition of appropriate adaptation measures for farming and production areas; Monitoring visits and documentation of the progress of adaptation measures. Identification of problems
	CAF/GADs	All cantons & parishes	Grants for implementation	20,000	25,000	130,000	125,000	**300,000**	3.2	Grants for implementation; Selection: Identify, through the defined procedures and actors, the participants for the construction of sustainable farms; The project management board reviews the profiles of participants entering into vulnerable groups for approval; Subsidy for 150 co-executors of vulnerable groups receive 75% of the cost and implementation of adaptation measures as grant. 25% they will put it as counterpart (labor); Delivery to the qualified suppliers of the values for the implementation by means of transference or certified check

	MAG	All cantons & parishes	Suppliers identification	5,000	10,000			**15,000**	3.3	Suppliers identification; Announcement for all suppliers interested in participating for the delivery of inputs for the construction of sustainable farms. Interesting stock, good experience and reputation is a plus; Visits each of the suppliers to verify the information provided and the prices offered.
			Subtotal					**340,000**		
4. At least 2 institutions have introduced specific solutions and credit assessments to support the disbursement of credits for adaptation, integrating environmental and climatic risks in their operations.	MAE	All cantons & parishes	Contractual services individual	5,000	5,000	5,000		**15,000**	4.1	Selection of consultants who will work on the development of output 2 and 3. Knowledge and good experience in the field of software-based green lending or climate financing will be required; Identification of adequate EbA and other adaptation emasures for target customers of participating financial institutions;
	MAE	All cantons & parishes	Contractual services company	5,000	10,000			**15,000**	4.2	ICT solution to automatically and systematically collect data in the field, software to facilitate the identification, qualification, monitoring and reporting of adaptation credits.
	MAE	All cantons & parishes	Contractual services company	15,000	15,000	10,000	10,000	**50,000**	4.3	Development of climate smart lending management, for different crops and to be implemented in lending processes of financial institutions; Development of policies and procedures of climate risk management in the institution; Development of financial products, product design including loan terms;
			Subtotal					**80,000**		

5. One investment fund to promote sustainable development is set up and operational	CAF / CFN	Sigchos	Trust expenses	21,000				**21,000**	5.1	Legal study for the set-up of the fund
	GAD SIGCHOS	Sigchos	Renting premise	3,600				**3,600**	5.2	Office rent for first year
	GADs SIGCHOS Y MEJIA	All cantons & parishes	Recruitment	31,200				**31,200**	5.3	Recruitment of personnel of first year
	GADs SIGCHOS Y MEJIA	All cantons	Vehicle, equipment and furniture	26,000				**26,000**	5.4	Physical infrastructure of the investment fund
	GAD SIGCHOS	Sigchos	Miscellaneous expenses	3,600				**3,600**	5.5	Office supplies, administrative expenses
	GADs SIGCHOS Y MEJIA	Sigchos	Invetsment in sustainable development investment trust	109200	109200	109200	109200	**327,600**	5.6	Seed investment for the set-up pof the fund
	GAD SIGCHOS	Sigchos	Economic incentives for adaptation disbursements tools	2000	2,000	2,,000		**6,000**	5.7	Economic incentives for eligible lending customers that will invest into EbA and other adaptation options
	GAD SIGCHOS	Sigchos	Reporting				1,000	**1,000**	5.8	Ekaboration of reporting per year, including monitoring visits of financed custoemrs;
			Subtotal					**420,000**		
6. At least 6 parishes being trained to take care and use meteorological information generated by meteorological stations currently installed.	INAHMI / GADs	All parishes	Miscellaneous expenses			10,000	10,000	**20,000**	6.1	Training in use and maintenance of meteorological stations for technical staff of each GAD.
	INAHMI / GADs parishes	All parishes	Contractual services individual		10,000	10,000	10,000	**30,000**	6.2	Changing administrative operations from INAMHI to GAD technical personal staff.
	INAHMI / GADs parishes	All parishes	Miscellaneous expenses			40,000	40,000	**80,000**	6.3	Training 500 families in the use of climate data and their application in activities, such as: agriculture and livestock. This training will be address for 55% percent of women. Including field visits, food and transportation.

	INAHMI / GADs parishes	All parishes	Audiovisual & print production costs			5,000	5,000	**10,000**	6.4	Designing of interactive content and generation of newsletters to training GAD population in the area including women associations, older adults and vulnerable groups.
	INAHMI / MAE	All parishes	Contractual services individual		6,666	6,667	6,667	**20,000**	6.5	Integrating the digital media technologies for communication plan and addressed it to the population in general including women, older adult, youth people and children's.
			Subtotal					**160,000**		
7. Six development plans of local parishes incorporate measures for ecosystem-based adaptation to climate change	GADs	All parishes	Local consultants	10,000				**10,000**	7.1	Conducting a technical study to determinate which climate change adaptation measures that must be added for development and territorial planning plans.
	GADs	All parishes	Local consultants	5,000	5,000	5,000	5,000	**20,000**	7.2	Gathering information on climate change adaptation measures to be added like indicators and statistics into the development and territorial planning plans. The indicators should include gender information and vulnerable groups for climate change.
	GADs	All parishes	Local consultants		10,000	10,000	10,000	**30,000**	7.3	Developing new development and territorial planning documents adding climate change statistics and information and also including gender and vulnerable group's climate change issues.
	GADs	All parishes	Miscellaneous expenses		3,333	3,333	3,333	**10,000**	7.4	Training for population including associations, organizations and other stakeholder of the project about climate change adaptation measures incorporated in the PDOTs.
	GADs	All parishes	Miscellaneous expenses		3,333	3,333	3,333	**10,000**	7.5	Socialize new PDOTs documents with the population of the project area including associations, organizations and the population in general.
			Subtotal					**80,000**		

8. Strategic plan of communication, education, knowledge transference and scheme of replica, including demonstration farms. Plus training on adaptation finance to financial institutions.	GADs	All parishes	Contractual Individual Services	5,000	5,000	5,000	5,000	**20,000**	8.1	Developing a communication plan addressed for stakeholders in the project including specific women associations and organizations.
	Project Manager / GADs	All parishes	Contractual Individual Services	3,750	3,750	3,750	3,750	**15,000**	8.2	Integrating the digital media technologies for communication plan and addressed it to the population in general including women, older adult, youth people and children's.
	Project Manager / GADs	All parishes	Miscellaneous expenses	6,250	6,250	6,250	6,250	**25,000**	8.3	Sharing lessons learned and experiences with project stakeholders, and replicate knowledge to other similar projects in the country trught demostrative farms applying sustainable methods for agriculture, livestock and panela production
	Project Manager / GADs	All parishes	Miscellaneous expenses	5,000	5,000	5,000	5,000	**20,000**	8.4	Training modular courses on sustainable agriculture and good agricultural practices, open to associations and selected farmers to participate. 12 modules, 6 theorists, 6 in the field and an on-site supervision within 6 months of completing the course. 50% women
	Project Manager	All parishes	Local consultants	5,000	5,000	5,000	5,000	**20,000**	8.5	Training for all Microfinance Institution (MFI) staff participating in climate risk, green credit and climate change issues with a focus on microfinance
	Project Manager	All parishes	Local consultants	5,000	5,000	5,000	5,000	**20,000**	8.6	Certification of organic crops or good agricultural practices for the production of panela, mortiño wine or crops of sugar or naranjilla, of those graduates with better performance in their crops.
			Subtotal					**120,000**		
9. Systematisation of information gathered during the whole project design	MAE	All parishes	Contractual services individual	15,000	5,000	5,000		**25,000**	9.1	Developing a technological platform to manage knowledge and information about climate change adaptation, using disruptive technologies like: big data and cloud computing.

and implementation using existing informatics platforms	MAE	All parishes	Contractual services individual	10,000				**10,000**	9.3	Integrating technological platform into others technological platforms used by the Ministry of Environment.
	MAE / GADs	All parishes	Contractual services individual	2,500	2,500			**5,000**	9.4	Sociability of the technological platform with all stakeholders in the project including associations and organizations.
			Subtotal					**40,000**		
Total project components cost								**2.190,000**		
Project/Programme Execution cost								**114,975**		
Details	FAO	Ecuador	Direct Project Services Coordination Unit	20000	20000	20000	20000	**80.000**	Section H	Direction Services
	FAO	Ecuador	Direct Project Services Miscellaneous expenses	8743,75	8743,75	8743,75	8743,75	**34.975**	Section H	Direction Services
Total project cost								**2,304,975**		
Project/Programme Cycle Management Fee charged by the Implementing Entity (if applicable)								**184,398**		
Details	CAF	Ecuador	Financial administration.	6250	6250	6250	6250	**25.000**	Section H	Financial administration of project funds and accounting services.
	CAF	Ecuador	Procurement and miscellaneous expenses	9600	9600	9600	9600	**38.400**	Section H	Procurement of goods, works and services and contract administration. Including management of project personnel and consultants.
	CAF	Ecuador	Project oversight.	6250	6250	6250	6250	**25.000**	Section H	Project oversight. Including visits to project sites to verify quality of deliverables, and overseeing independent evaluations. Audit.
	CAF	Ecuador	Reporting		26837	26837	26837	**80.511**	Section H	Reporting. Including technical, administrative and financial reports to the Adaptation Fund. Preparation of annual Project

										Performance Report (PPR). Translations.
	CAF	Ecuador	Support services to the project´s management unit within CAF	3871	3871	3871	3874	**15.487**	Section H	Provide office space and support services to the project´s management unit within CAF
TOTAL								**2,489,373**		

H. Include a disbursement schedule with time-bound milestones.

Disbursement Schedule

Annual Budget	Year 0	Year 1	Year 2	Year 3	TOTAL
ProjecT funds	$ 620,397.08	$ 571,830.08	$ 637,581.10	$ 475,166.74	$ 2,304,975.00
Project Implementation Fee	$ 25,971.00	$ 52,808.00	$ 52,808.00	$ 52,811.00	$ 184,398.00
TOTAL	**$ 646,368.08**	**$ 624,638.08**	**$ 690,389.10**	**$ 527,977.74**	**$ 2,489,373.00**

Output	Responsible entity	Canton / Parrish	Budget description	Year 1	MILESTONE	Year 2	MILESTONE	Year 3	MILESTONE	Year 4	Total and Budget note	
1. 1,000 ha of native vegetation is conserved by sustainable forest management and conservation mechanisms.	MAE	All cantons & parishes	Contractual services company (ACUS management plan-conservation bio-corridor)	46,500	ACUS Management Plan according Bio corridor for the conservation elaborated.				ACUS model implemented		**46,500**	1.1
	MAE	All cantons & parishes	Local consultants (Financial and operational sustainability strategy)		Improvement land tenure	23,333	Financial and operational sustainability strategy elaborated	23,333		23,333	**70,000**	1.2
	MAE	All cantons & parishes	Contractual services individual	5,375	Technicians for application of	5375		5375	M&E	5375	**21,500**	1.3

			(Management and operation model)		Management Model							
	MAE	All cantons	Contractual services company (Increases in # of Decentralized Governments (GAD) with planning, regulatory and normative instruments for ACUS)	3,500	Joint identification (PA authorities and GADs) of key habitats	3,500		3,500	PDOT implemented	3,500	**14,000**	1.4
	MAE	All parishes	Equipment and furniture (Strengthen incentive systems for set-asides on private and community lands based ACUS and technology change)	62,500	Strengthen incentive systems for set-asides on private and community lands based ACUS	62500		62500	Ha under conservation category	37500	**225,000**	1.5
	MAE	All cantons	Local consultants (Municipal PAs gazetted, covering 1,000ha, in buffer-zones and	3,000		3,000	Proposed for monitoring Municipal PAs covering 1,000ha, in buffer-zones	3,000	M&E	3,000	**12,000**	1.6

			corridors identified as critical for water hydrological cycle)									
	MAE	All parishes	Equipment and furniture (Promotion of habitat and connectivity -friendly production options)		Initial studies	20000	Training communities for promotion of habitat and connectivity-friendly production options	20000		20000	**60,000**	1.7
	MAE	All cantons & parishes	Contractual services individual (Increases in # families in communities adjoining conservation areas in target ACUS which at least 50% of women participation)		Technical support	667	Technicians for Planning and zoning of the river basin and productive alternatives	8,667		8,667	**18,000**	1.8
	MAE	All parishes	Equipment and furniture (Strengthening of the hydro-meteorological monitoring system in the Toachi-		Initial studies	8000		25000	Equipment for strengthening of the hydro-meteorological monitoring system		**33,000**	1.9

			Pilaton river basin.)									
			Subtotal								**500,000**	
2. Improved management of existing protected forests and private conservation areas (ca. 230,000 ha)	MAE	All parishes	Contractual services individual (Reduction in the use of forest wood for productive activities in the Upper and Middle Basin)	17,875	Technicians for community training, planning and Reduction in the use of forest wood for productive activities	17875		17875		17875	**71,500**	2.1
	MAE	All parishes	Equipment and furniture (Technology change (ovens change to promote efficiency in the production of panela)	43,720		43,720	Technology change (ovens change to promote efficiency in the production of panela) and sustainable production	43,720		43,840	**175,000**	2.2
	MAE	All cantons	Contractual services company (Planning and zoning of the river basin with a participatory and inclusive approach. Promote dialogue,	10,333	Governance analysis performed to provide recommendations	10,333	M&E	10,333	M&E		**31,000**	2.3

			coordination and technical support at local level)									
	MAE	All parishes	Contractual services individual (Management plan of the protector forest, including ravine and shore protection activities.)			10,000	Assessment, monitoring and evaluation of farms to perform and provide technology transfer	10,000	5,000		**25,000**	2.4
	MAE	All parishes	Contractual services individual (Train farmers in conservation practices and climate change)	4,000	Technical staff	4,000	Assessment, monitoring and evaluation of farms to perform and provide technology transfer	4,000		4,000	**16,000**	2.5
	MAE	All cantons & parishes	Equipment and furniture (Increases in ratings of Management Effectiveness Tracking Tool and PGOA)	15,000	Increases in ratings of Management Effectiveness Tracking Tool and PGOA	15,000		15,000		15,000	**60,000**	2.6

	MAE	All cantons	Equipment and furniture (Increases in control capacities in wildlife and forest traffic)	35,750	increases in control capacities in wildlife and forest traffic; Strengthen Tandapi control point	35,750	Equipment for environmental control mainly forest and wildlife with supporting UPMA				**71,500**	2.7
			Subtotal								**450,000**	
3. 250 ha of pasture and 250 ha of crops apply sustainable farming practices	MAE	All cantons & parishes	Contractual services individual	10,000	Technical staff	15,000					**25,000**	3.1
	CAF/GADs	All cantons & parishes	Grants for implementation	20,000	First group of participants must have been selected and initiated the training (output8)	25,000	2th group of participants selected and trained. Investment plan verified	130,000	3th group of participants selected and trained. Investment plan verified	125,000	**3000,000**	3.2
	MAG	All cantons & parishes	Suppliers identification	20,000	Goods for sustainable practices	10,000	M&E				**30,000**	3.3
			Subtotal								**220,000**	
4. At least 2 institutions have introduced specific solutions and credit assessments	MAE	All cantons & parishes	Contractual services individual	10,000	Technical support		5,000				**15,000**	4.1
	MAE	All cantons & parishes	Contractual services company	10,000	Personnel trained (output 8)	5,000					**15,000**	4.2

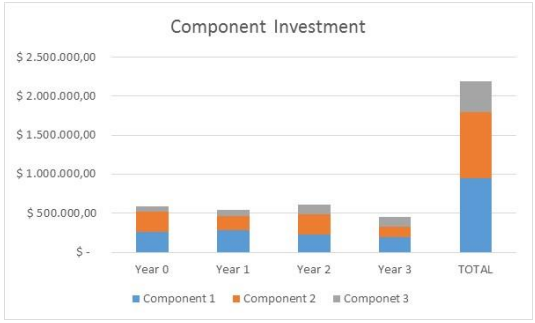
to support the disbursement of credits for adaptation, integrating environmental and climatic risks in their operations.	MAE	All cantons & parishes	Contractual services company	12,000	1) Catalog of adaptation measures developed; 2) Personnel trained (output 8)	16,000	2) Personnel trained (output 8)	11,000		11,000	**50,000**	4.3
			Subtotal								**80,000**	
5. One investment fund to promote sustainable development is set up and operational	CAF / CFN	Sigchos	Trust expenses	21,000							**21,000**	5.1
	GAD SIGCHOS	Sigchos	Renting premise	3,600							**3,600**	5.2
	GADs SIGCHOS Y MEJIA	All cantons & parishes	Recruitment	31,200	The trust is legally constituted						**31,200**	5.3
	GADs SIGCHOS Y MEJIA	All cantons	Vehicle, equipment and furniture	33,000	Staff hired						**33,000**	5.4
	GAD SIGCHOS	Sigchos	Miscellaneous expenses	3,600							**3,600**	5.5
	GADs SIGCHOS Y MEJIA	Sigchos	Investment in sustainable development investment trust	109200	Staff, premises and equipment's must be complete	109200	Investment fund	109200	Operating investment fund	109200	**327,600**	5.6
	GAD SIGCHOS	Sigchos	Economic incentives for adaptation disbursements	2,000	First group of participants must have been selected and initiated the training (output8)	2,000	2th group of participants selected and trained. Investment plan verified	2,000	3th group of participants selected and trained. Investment plan verified		**6,000**	5.7
	GAD SIGCHOS	Sigchos	Reporting							1,000	**1,000**	5.8

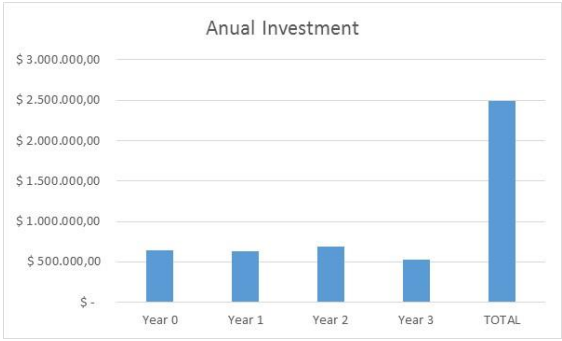
			Subtotal								**420,000**	
6. At least 6 parishes being trained to take care and use meteorological information generated by meteorological stations currently installed.	INAHMI / GADs	All parishes	Miscellaneous expenses					10,000	50% parishes trained in meteorological stations	10,000	**20,000**	6.1
	INAHMI / GADs parishes	All parishes	Contractual services individual			10,000	2 GADs operating meteorological stations	10,000	4 GADs operating meteorological stations	10,000	**30,000**	6.2
	INAHMI / GADs parishes	All parishes	Miscellaneous expenses					40,000	50% families trained in climate data	40,000	**80,000**	6.3
	INAHMI / GADs parishes	All parishes	Audiovisual & print production costs					5,000	Interactive content developed and delivered	5,000	**10,000**	6.4
	INAHMI / MAE	All parishes	Contractual services individual			6,666	Data send from meteorological station to MAE platforms	6,667	Data send from meteorological station to MAE platforms	6,667	**20,000**	6.5
			Subtotal								**160,000**	
7. Six development plans of local parishes incorporate measures for ecosystem-based adaptation to climate change	GADs	All parishes	Local consultants	10,000	Technical study finished						**10,000**	7.1
	GADs	All parishes	Local consultants	5,000	climate change measures defined	5,000	climate change measures defined	5,000	climate change measures defined	5,000	**20,000**	7.2
	GADs	All parishes	Local consultants			10,000	PDOT published	10,000	PDOT published	10,000	**30,000**	7.3
	GADs	All parishes	Miscellaneous expenses			3,333		3,333		3,333	**10,000**	7.4
	GADs	All parishes	Miscellaneous expenses			3,333	Trained population	3,333	Trained population	3,333	**10,000**	7.5

			Subtotal								**80,000**	
8. Strategic plan of communication, education, knowledge transference and scheme of replica, including demonstration farms. Plus training on adaptation finance to financial institutions.	GADs	All parishes	Contractual Individual Services	5,000	events of communication delivered for all population	5,000	events of communication delivered for all population	5,000	events of communication delivered for all population	5,000	**20,000**	8.1
	Project Manager / GADs	All parishes	Contractual Individual Services	3,750	plan communication delivered using media technologies	3,750	plan communication delivered using media technologies	3,750	plan communication delivered using media technologies	3,750	**15,000**	8.2
	Project Manager / GADs	All parishes	Miscellaneous expenses	6,250	Sharing lessons learned	6,250	Sharing lessons learned	6,250	Sharing lessons learned	6,250	**25,000**	8.3
	Project Manager / GADs	All parishes	Miscellaneous expenses	5,000	Trained farms in sustainable agriculture	5,000	Trained farms in sustainable agriculture	5,000	Trained farms in sustainable agriculture	5,000	**20,000**	8.4
	Project Manager	All parishes	Local consultants	5,000	trained staff of finance institutions	5,000	trained staff of finance institutions	5,000	trained staff of finance institutions	5,000	**20,000**	8.5
	Project Manager	All parishes	Local consultants	5,000	certificated organic crops	5,000	certificated organic crops	5,000	certificated organic crops	5,000	**20,000**	8.6
			Subtotal								**120,000**	
9. Systematization of information gathered during the whole project design and implementation using existing informatics platforms	MAE	All parishes	Contractual services individual	15,000	platform developed, installed and operating	5,000	platform maintenance and operation	5,000	platform maintenance and operation		**25,000**	9.1
	MAE	All parishes	Contractual services individual	10,000	platform integrated to IT MAE Systems						**10,000**	9.3
	MAE / GADs	All parishes	Contractual services individual	2,500	50% of population with access to platform	2,500	100% of population with access to platform				**5,000**	9.4
			Subtotal								**40,000**	

Total project cost												**2,190,000**
Project/Programme Execution cost												**114,975**
Details	**FAO**	Ecuador	Direct Project Services Coordination Unit	20000	Project Unit consolidation	20000	Midterm Review support	20000	Final Evaluation support	20000	Support Exit Strategy	**80.000**
	FAO	Ecuador	Direct Project Services Miscellaneous expenses	8743,75	Project Unit consolidation	8743,75	Contract services support	8743,75	Communication plan support	8743,75	Goods and services delivery	**34.975**
Total project cost												**2.304.975**
Project/Programme Cycle Management Fee charged by the Implementing Entity (if applicable)												**184.398**
Details	CAF	Ecuador	Financial administration.	6250	Project Unit account	6250	Financial oversight	6250		6250	Operational oversight	**25000**
	CAF	Ecuador	Procurement and miscellaneous expenses	9600	Project Unit	9600	Office supplies and support	9600	Office supplies and support	9600	Office supplies and support	**38400**
	CAF	Ecuador	Project oversight.	6250	Inception support	6250	Middle Term Review support	6250	Gender report support	6250	Final Evaluation support and Audit	**25000**
	CAF	Ecuador	Reporting		Inception report and translation	26837	Annual report and translation	26837	Annual report	26837	Final Report	**80511**
	CAF	Ecuador	Support services to the project´s management unit within CAF	3871	Project Unit support	3871	Project Unit support	3871	Project Unit support	3874	Operational process and closure	**15487**
TOTAL												**2,489,373**

Annual Budged	Year 0	Year 1	Year 2	Year 3	TOTAL
Project funds	$ 620.397,08	$ 571.830,08	$ 637.581,10	$ 475.166,74	$ 2.304.975,00
Project Implementation Fee	$ 25.971,00	$ 52.808,00	$ 52.808,00	$ 52.811,00	$ 184.398,00
TOTAL	$ 646.368,08	$ 624.638,08	$ 690.389,10	$ 527.977,74	$ 2.489.373,00





PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. Record of Endorsement on behalf of the Government

Project: **Increasing adaptive capacity of local communities, ecosystems and hydroelectric systems in the Río Blanco upper watershed (Toachi-Pilatón watershed) focusing on Ecosystem and Community Based Adaptation and Integrated Adaptive Watershed Management.**

PAULO ARTURO PROAÑO ANDRADE
Minister of Environment Ecuador

National Designated Authority Date: 22 May 2020

Project's Contact Person: Nicolás Zambrano

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