



ADAPTATION FUND

AFB/PPRC.17/8
25 September 2015

Adaptation Fund Board
Project and Programme Review Committee
Seventeenth Meeting
Bonn, Germany, 6-7 October 2015

Agenda Item 6 c)

PROPOSAL FOR ECUADOR

Background

1. The Operational Policies and Guidelines (OPG) for Parties to Access Resources from the Adaptation Fund (the Fund), adopted by the Adaptation Fund Board (the Board), state in paragraph 45 that regular adaptation project and programme proposals, i.e. those that request funding exceeding US\$ 1 million, would undergo either a one-step, or a two-step approval process. In case of the one-step process, the proponent would directly submit a fully-developed project proposal. In the two-step process, the proponent would first submit a brief project concept, which would be reviewed by the Project and Programme Review Committee (PPRC) and would have to receive the endorsement of the Board. In the second step, the fully-developed project/programme document would be reviewed by the PPRC, and would ultimately require the Board's approval.

2. The Templates approved by the Board (OPG, Annex 4) do not include a separate template for project and programme concepts but provide that these are to be submitted using the project and programme proposal template. The section on Adaptation Fund Project Review Criteria states:

For regular projects using the two-step approval process, only the first four criteria will be applied when reviewing the 1st step for regular project concept. In addition, the information provided in the 1st step approval process with respect to the review criteria for the regular project concept could be less detailed than the information in the request for approval template submitted at the 2nd step approval process. Furthermore, a final project document is required for regular projects for the 2nd step approval, in addition to the approval template.

3. The first four criteria mentioned above are:

1. Country Eligibility,
2. Project Eligibility,
3. Resource Availability, and
4. Eligibility of NIE/MIE.

4. The fifth criterion, applied when reviewing a fully-developed project document, is:
5. Implementation Arrangements.

5. It is worth noting that since the twenty-second Board meeting, the Environmental and Social (E&S) Policy of the Fund was approved and consequently compliance with the Policy has been included in the review criteria both for concept documents and fully-developed project documents. The proposals template was revised as well, to include sections requesting demonstration of compliance of the project/programme with the E&S Policy.

6. In its seventeenth meeting, the Board decided (Decision B.17/7) to approve "Instructions for preparing a request for project or programme funding from the Adaptation Fund", contained in the Annex to document AFB/PPRC.8/4, which further outlines applicable review criteria for both concepts and fully-developed proposals. The latest version of this document was launched in conjunction with the revision of the Operational Policies and Guidelines in November 2013.

7. Based on the Board Decision B.9/2, the first call for project and programme proposals was issued and an invitation letter to eligible Parties to submit project and programme proposals to the Fund was sent out on April 8, 2010.

8. According to the Board Decision B.12/10, a project or programme proposal needs to be received by the secretariat no less than nine weeks before a Board meeting, in order to be considered by the Board in that meeting.

9. The following project concept document titled “Reduction of the Toachi Pilatón hydroelectric plant’s vulnerability to the effects of climate change with a focus on Integrated, Adaptive Watershed Management - MATCH” was submitted by the Corporación Andina de Fomento (CAF), which is a Regional Implementing Entity of the Adaptation Fund.

10. This is the first submission of the proposal. It was received by the secretariat in time to be considered in the twenty-sixth Board meeting. The secretariat carried out a technical review of the project proposal, assigned it the diary number ECU/RIE/Energy/2015/1, and completed a review sheet.

11. In accordance with a request to the secretariat made by the Board in its 10th meeting, the secretariat shared this review sheet with CAF, and offered it the opportunity of providing responses before the review sheet was sent to the PPRC.

12. The secretariat is submitting to the PPRC the summary and, pursuant to decision B.17/15, the final technical review of the project, both prepared by the secretariat, along with the final submission of the proposal in the following section. In accordance with decision B.25.15, the proposal is submitted with changes between the initial submission and the revised version highlighted.

Project Summary

Ecuador – Reduction of the Toachi Pilatón hydroelectric plant’s vulnerability to the effects of climate change with a focus on Integrated, Adaptive Watershed Management - MATCH

Implementing Entity: CAF

Project/Programme Execution Cost: USD 199,975

Total Project/Programme Cost: USD 2,304,975

Implementing Fee: USD 184,398

Financing Requested: USD 2,489,373

Project Background and Context:

Since 2008, the Ecuadorian government has implemented a series of actions aiming at transforming the country’s energy matrix including, among others, the construction of new hydroelectric projects, including the Toachi Pilatón hydroelectric plant that will begin operating in late 2015. This is taking place in a context of significant vulnerability to climate change effects, and the hydropower sector has been identified as highly vulnerable. It is against this background that the proposed project will increase the resilience of the basin’s environmental and social systems through integrated watershed management and ecosystem-based adaptation. The project targets the Rio Blanco sub-basin located in the southwest of the Pichincha province. The planned activities will, among others, introduce sustainable management system for productive areas and establish protected zones for the riverbank in prioritized rivers and gorges, and construct small-scale dams and panholes for sediment retention and water availability improvement.

Component 1: Implement adaptation measures to reduce vulnerability and enhance resiliency/adaptation capacity in the face of climate change through the adaptive integrated management of the watersheds for the Toachi and Pilatón Rivers. (USD 1,570,000)

Under this component (the largest in terms of budget), the project will implement a series of planning measures to improve the resilience of local communities and to reduce the watershed’s vulnerability to the effects of climate change, following an Integrated Watershed Management and Adaptation Ecosystem-based Adaptation approach and corresponding tools. 1,000 hectares of forests will be protected, sustainable management systems will be introduced on 125 hectares, riverbank management will be promoted, and small-scale dams and panholes will be constructed.

Component 2: Strengthening of capacity to increase resilience to climate change among the local stakeholders living within the basin’s area (USD 220,000)

The project will promote stakeholders and institutions’ empowerment to drive the basin’s necessary adaptation to the effects of climate change, and to ensure the effective implementation of actions and measures. Climate change plans will be developed over three decentralized autonomous governments (DAGs), 1,200 basin inhabitants will be trained on the topic of climate change, technical trainings will be delivered to staffs from the power plant and from the DAGs, and dialogue between stakeholders will be encouraged.

Component 3: Increase knowledge of integrated watershed management, protective forests and measures for adaptation to climate change (USD 315,000)

Under this component, the project will design a structure for watershed management and support the Secretariat of Water in establishing a basin council. In addition, management plans will be developed for two protective forests located in the target area, and a monitoring network of rainfall, flows and sediments will be established. Finally, knowledge sharing mechanisms will be implemented.



ADAPTATION FUND

**ADAPTATION FUND BOARD SECRETARIAT TECHNICAL REVIEW
OF PROJECT/PROGRAMME PROPOSAL**

PROJECT/PROGRAMME CATEGORY: Regular-sized Project Concept

Country/Region: **Ecuador**
 Project Title: **Reduction of the Toachi Pilatón hydroelectric plant’s vulnerability to the effects of climate change with a focus on Integrated, Adaptive Watershed Management - MATCH**
 AF Project ID: **ECU/RIE/Energy/2015/1**
 IE Project ID: Requested Financing from Adaptation Fund (US Dollars): **\$2,489,373**
 Reviewer and contact person: **Hugo Remaury** Co-reviewer(s): **Shyla Raghav, Ming Yang**
 IE Contact Person: **Ligia Castro, CAF Development Bank of Latin America**

Review Criteria	Questions	Comments on 21/8/2015	Comments on 10/9/2015
Country Eligibility	1. Is the country party to the Kyoto Protocol?	Yes	
	2. Is the country a developing country particularly vulnerable to the adverse effects of climate change?	Yes. Ecuador is a country acutely aware of the impacts of climate change, largely felt through impacts related to water.	
Project Eligibility	1. Has the designated government authority for the Adaptation Fund endorsed the project/programme?	Yes	
	2. Does the project / programme support concrete adaptation actions to assist the country in addressing adaptive capacity to the adverse effects of climate change and build in climate resilience?	Requires clarification. While it is clear that the hydropower industry is vulnerable to the impacts of climate change, the project should clarify how the investment supports the people of Ecuador involved in this project, considering potential trade-offs in the alternative demands for water in a climate-constrained future.	

		<p>CR1: Please clarify if the findings of the assessment/study described on page 3 concluded that the Toachu Pilaton plant is the most vulnerable in the country to the impacts of climate change, including information on projected climate change impacts in the region/sector.</p> <p>CR2: Please provide more details about what integrated management of the watershed, and sustainable practices will entail in the context of this project, particularly with respect to addressing non-climate drivers of deforestation and degradation.</p> <p>CR3: Please clarify the ultimate and overall objective of the project (concrete outcomes expected for both communities and the hydropower sector), and most importantly, why/how the intended activities are envisioned to contribute to this objective in concrete terms, especially given potential uncertainty in the long-term impacts of ecosystem-based measures.</p> <p>CR4: There appears to be some duplication and overlap between the 3 project components, such as 1.1 and 3.2, for instance. Please clarify how the 3 components of the project link together or build on each other.</p> <p>CR5: Please clarify if in 1.1 the areas have already been identified, and if not, how they will be selected. Please also clarify if there is a political plan to</p>	<p>CR1: Somewhat addressed. Proponent should address what characteristics make the selected site the highest vulnerability and a sound investment for the country.</p> <p>CR2: Partially addressed</p> <p>CR3: Not addressed. No response given.</p> <p>CR4:Addressed</p> <p>CR5: Not addressed. The additional detail requested was not populated in the concept.</p>
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		<p>ensure the protection of these areas. Please also provide this information for all other project activities (for instance, for 1.2, how size and location of areas and practices will be selected).</p> <p>CR6: For Component 2, please clarify why/how the targets of capacity building were each selected, and how their capacitation will contribute to the overall project objective in the long-term.</p> <p>CR7: Please clarify whether the activities described in Component 3.1a and b, and 3.3, will be used to inform or feed into Components 1 and 2.</p>	<p>CR6: Not addressed directly.</p> <p>CR7: Addressed</p>
	<p>3. Does the project / programme provide economic, social and environmental benefits, particularly to vulnerable communities, including gender considerations, while avoiding or mitigating negative impacts, in compliance with the Environmental and Social Policy of the Fund?</p>	<p>Requires clarification. The overall benefit of the project to hydro-electric power generation is clear. However, the benefits to communities, women, and marginalized communities are not clear.</p> <p>CR8: Please address how this project will engage and benefit the most vulnerable, women, indigenous communities, and other marginalized individuals.</p> <p>CR9: Please clarify how the intended activities will directly generate income for communities within the scope of the outputs of this project.</p> <p>CR10: Please clarify how beneficiaries will be selected for the project, and how this will be sensitive to marginalized groups, indigenous people and women.</p>	<p>CR8: Partially addressed but more information required at the full proposal stage.</p> <p>CR10: Partially addressed. More detail and justification required.</p> <p>CR11: Addressed but more information required at the full proposal stage.</p>
	<p>4. Is the project / programme</p>	<p>Requires clarification. The project</p>	

	cost effective?	<p>invests in low-cost ecosystem-based measures to secure the hydropower investments, as well as to promote sound land and water-management practices that will support inhabitants in the watershed sustain their water security.</p> <p>CAR1: However, this section should compare the relative costs of the project and expected outcomes (benefits) and demonstrate, to the extent possible, the cost-effectiveness of the project vis-à-vis alternate adaptation options that would achieve the same result. To the extent possible, the project should provide evidence on the return on this investment.</p>	<p>CAR1: Not addressed. This section should compare the proposed intervention to other viable alternatives. The “benefits” also remain vague and unclear.</p>
	5. Is the project / programme consistent with national or sub-national sustainable development strategies, national or sub-national development plans, poverty reduction strategies, national communications and adaptation programs of action and other relevant instruments?	<p>Yes, the project aims are in alignment with the relevant national strategies and plans.</p>	
	6. Does the project / programme meet the relevant national technical standards, where applicable, in compliance with the Environmental and Social Policy of the Fund?	<p>Mostly. No local or national laws are violated by implementing the measures defined in the project. The project will contribute to compliance with current regulations for the environment, construction, participation, and planning in the applicable legislation.</p>	

		CR11: Please clarify any relevant regulations and standards for Component 1.4.	CR11: Addressed
	7. Is there duplication of project / programme with other funding sources?	Not clear. There appears to be significant overlap in similar activities conducted through other initiatives, albeit with different objective. However, if the other programs promote similar activities, there still could be some duplicative activities, or activities that are rendered unnecessary due to existing investment. CAR2: Please provide a more comprehensive assessment of duplicative funding, including how distinction and delineation of AF resources will be ensured.	CAR2: Not addressed. Additional explanation needed, as well as a clearer description of the implementation of other activities in vulnerable communities.
	8. Does the project / programme have a learning and knowledge management component to capture and feedback lessons?	Yes, component 3 has several intended activities targeting knowledge management and learning.	
	9. Has a consultative process taken place, and has it involved all key stakeholders, and vulnerable groups, including gender considerations?	Not entirely. It seems as if no local communities were consulted initially, and gender issues were not addressed. Since this project involves many local people, it is strongly advised to have some element of consultation at the concept stage, particularly to assess if the proposed activities are within the interests, priorities, and capacities of the people. CR12: Given the involvement of communities in this project, initial consultations are required at the	CR12:Not addressed – outcomes of meeting referenced in response have not been shared.

		concept level. Please provide information on outcomes of community consultations, clarifying how the proposed project responds to local community needs and concerns, as well as a plan for more comprehensive community consultations for the full proposal.	
	10. Is the requested financing justified on the basis of full cost of adaptation reasoning?	Not entirely. This section should assess additionality, and should compare the baseline (no AF funding) to the intended outcome of the project. CAR3: Please include assessment of the project relative to a baseline. CR13: On page 32, please explain how the 122,000 tons/year of CO2 reduction was calculated.	CAR3: Not addressed. This section should be structured by identifying the baseline (no AF funding) to proposed measures. CR13: Not addressed. No justification or calculation on this figure has been supplied.
	11. Is the project / program aligned with AF's results framework?	Yes, potentially, but pending resolution of other CARs and CRs.	
	12. Has the sustainability of the project/programme outcomes been taken into account when designing the project?	Possibly, pending resolution of CRs 2-6. CR14: Please expand on the ways in which Component 3.2 will encourage the long-term sustainability of the project.	CR14: Somewhat addressed.
	13. Does the project / programme provide an overview of environmental and social impacts / risks identified?	CR15: While the project itself does not include large-scale construction, it is necessary to evaluate the impact of the plant on Indigenous Peoples and Involuntary Resettlement, particularly if the project may increase the viability of hydropower generation, having consequences for the surrounding communities. Please provide a more complete assessment of potential risks	CR15: Addressed

		that might result from the project, given that it has been classified as Category B.	
Resource Availability	1. Is the requested project / programme funding within the cap of the country?	Yes	
	2. Is the Implementing Entity Management Fee at or below 8.5 per cent of the total project/programme budget before the fee?	Yes, 7.4%	
	3. Are the Project/Programme Execution Costs at or below 9.5 per cent of the total project/programme budget?	Yes, 8.7%	
Eligibility of IE	4. Is the project/programme submitted through an eligible Implementing Entity that has been accredited by the Board?	Yes, the proposal has been submitted by an accredited RIE.	
Implementation Arrangements	1. Is there adequate arrangement for project / programme management?	N/A	
	2. Are there measures for financial and project/programme risk management?	N/A	
	3. Are there measures in place for the management of for environmental and social risks, in line with the Environmental and Social Policy of the Fund? Proponents are encouraged to refer to the draft	N/A For future reference, please consider the potential risks identified in CRs 8-9, 10-11, and 15 will be mitigated through a comprehensive screening and plan.	

	Guidance document for Implementing Entities on compliance with the Adaptation Fund Environmental and Social Policy, for details.		
	4. Is a budget on the Implementing Entity Management Fee use included?	N/A	
	5. Is an explanation and a breakdown of the execution costs included?	N/A	
	6. Is a detailed budget including budget notes included?	N/A	
	7. Are arrangements for monitoring and evaluation clearly defined, including budgeted M&E plans and sex-disaggregated data, targets and indicators?	N/A	
	8. Does the M&E Framework include a break-down of how implementing entity IE fees will be utilized in the supervision of the M&E function?	N/A	
	9. Does the project/programme's results framework align with the AF's results framework? Does it include at least one core outcome indicator from the Fund's results framework?	N/A	

	10. Is a disbursement schedule with time-bound milestones included?	N/A	
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<p>Technical Summary</p>	<p>The project proposed to employ integrated, adaptive watershed management for the Toachu Pilaton watershed to ensure sustained hydropower production for the Toachu Pilaton plant. It proposed to employ a serious of ecosystem-based measures and management strategies to secure water resources for the plant in the long-term through minimization of practices that increase sedimentation and demand on potentially scarce water resources. However, the proposal should more clearly describe the connection and linkage between the selected activities and the intended outcome, particularly with respect to the potential implications for local communities. The proposal should also ensure that there are no duplicative activities in the area with potentially competing or repeated activities. The investment in these activities should be justified clearly relative to the ultimate objective.</p> <p>During the initial review, the following corrective action requests were made:</p> <p>CAR1: However, this section should compare the relative costs of the project and expected outcomes (benefits) and demonstrate, to the extent possible, the cost-effectiveness of the project vis-à-vis alternate adaptation options that would achieve the same result. To the extent possible, the project should provide evidence on the return on this investment.</p> <p>CAR2: Please provide a more comprehensive assessment of duplicative funding, including how distinction and delineation of AF resources will be ensured.</p> <p>CAR3: Please include assessment of the project relative to a baseline.</p> <p>In addition, the following clarification requests were made during the initial review:</p> <p>CR1: Please clarify if the findings of the assessment/study described on page 3 concluded that the Toachu Pilaton plant is the most vulnerable in the country to the impacts of climate change, including information on projected climate change impacts in the region/sector.</p> <p>CR2: Please provide more details about what integrated management of the watershed, and sustainable practices will entail in the context of this project, particularly with respect to addressing non-climate drivers of deforestation and degradation.</p> <p>CR3: Please clarify the ultimate and overall objective of the project (concrete outcomes expected for both communities and the hydropower sector), and most importantly, why/how the intended activities are envisioned to contribute to this objective in concrete terms, especially given potential uncertainty in the long-term impacts of ecosystem-based measures.</p> <p>CR4: There appears to be some duplication and overlap between the 3 project components, such as 1.1 and 3.2, for instance. Please clarify how the 3 components of the project link together or build on each other.</p> <p>CR5: Please clarify if in 1.1 the areas have already been identified, and if not, how they will be selected. Please</p>
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also clarify if there is a political plan to ensure the protection of these areas. Please also provide this information for all other project activities (for instance, for 1.2, how size and location of areas and practices will be selected).

CR6: For Component 2, please clarify why/how the targets of capacity building were each selected, and how their capacitation will contribute to the overall project objective in the long-term.

CR7: Please clarify whether the activities described in Component 3.1a and b, and 3.3, will be used to inform or feed into Components 1 and 2.

CR8: Please address how this project will engage and benefit the most vulnerable, women, indigenous communities, and other marginalized individuals.

CR9: Please clarify how the intended activities will directly generate income for communities within the scope of the outputs of this project.

CR10: Please clarify how beneficiaries will be selected for the project, and how this will be sensitive to marginalized groups, indigenous people and women.

CR11: Please clarify any relevant regulations and standards for Component 1.4

CR12: Given the involvement of communities in this project, initial consultations are required at the concept level. Please provide information on outcomes of community consultations, clarifying how the proposed project responds to local community needs and concerns, as well as a plan for more comprehensive community consultations for the full proposal.

CR13: On page 32, please explain how the 122,000 tons/year of CO2 reduction was calculated.

CR14: Please expand on the ways in which Component 3.2 will encourage the long-term sustainability of the project.

CR15: While the project itself does not include large-scale construction, it is necessary to evaluate the impact of the plant on Indigenous Peoples and Involuntary Resettlement, particularly if the project may increase the viability of hydropower generation, having consequences for the surrounding communities. Please provide a more complete assessment of potential risks that might result from the project, given that it has been classified as Category B.

The revised proposal has addressed some of the issues raised in the initial technical review. However, the overall justification and rationale of the project has not been demonstrated due to remaining uncertainties on the appropriateness of the interventions to address climate change impacts to vulnerable communities. The final project review finds that the proposal fails to correctly address the corrective action requests and clarifications requests made in the initial review. The following observations are made:

- (i) The concept proposal should clarify more clearly the ultimate and overall objective of the project (concrete outcomes expected for both communities and the hydropower sector), and most importantly, why/how the intended activities are envisioned to contribute to this objective in concrete terms,
- (ii) The concept proposal should further elaborate on the outcomes of consultations held with communities and demonstrate the extent to which they were taken into account during the design of the project, as

	well as clarify further how target regions and communities will be selected for the project, and (iii) The concept proposal should more clearly and robustly evaluate the cost-effectiveness of the project relative to viable adaptation alternatives, as well as comparing the proposed interventions to the baseline of no AF funding to justify the investment.
Date:	10 September 2015



ADAPTATION FUND

**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

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:	Reduction of the Toachi Pilatón hydroelectric plant's vulnerability to the effects of climate change with a focus on Integrated, Adaptive Watershed Management- MATCH.
Type of Implementing Entity:	RIE (Regional Implementing Entity)
Implementing Entity:	CAF Development Bank of Latin America
Executing Entity/ies:	Ministry of the Environment of Ecuador
Amount of Financing Requested:	US\$ 2'489.373,00

Project / Programme Background and Context:

About the problem the proposed project is aiming to solve

Since 2008, the Ecuadorian government has been implementing a series of actions aimed at transforming the country's energy matrix, including among others the construction of eight new hydroelectric projects (Coca Codo Sinclair, Delsitanisagua, Manduriacu, Mazar Dudas, Minas San Francisco, Quijos, Sopladora and Toachi Pilatón) which in conjunction will provide around 2,756 MW of **an** installed capacity. Based on this expansion, a gradual reduction in fossil fuel consumption is projected, which could reach 90% in the coming years.

The change in the country's energy matrix is taking place in a context of significant vulnerability to climate change effects. According to Ecuador's Ministry of the Environment, in the face of the effects of climate change, the hydropower sector is one of the most susceptible in Ecuador, such that the increase in extreme events, floods, droughts, erosion, and the sedimentation of rivers could produce a reduction in average energy production, greater variability, and increased uncertainty in hydroelectric generation, and thereby decrease the energy production of the largest hydroelectric

power plants such as Paute by 27%, while water volumes could be reduced by up to 75% relative to present supply.

To address this risk scenario, one of the actions implemented has been to initiate the project titled "Analysis of the vulnerability of flagship hydropower plants to the effects of climate change-(CHECC)", in 2014. It has been assigned a budget of the order \$ 1.9 MM, with the participation of institutions such as the Ministries of the Environment, Strategic Sectors Coordinator, of Electricity and Renewable Energy, the National Water Secretariat (SENAGUA: acronym in Spanish), the National Institute of Meteorology and Hydrology, the Electric Corporation of Ecuador-CELEC, Hidrotoapi, HidroEquinoccio, Coca Sinclair EP, the Regulatory and Electrical Control Agency, and the National Institute for Energy Efficiency and Renewable Energy.

There is no information available for all hydropower plants of Ecuador, but the analyses carried out by the MAE within the framework of the CHECC project reveal that of the 4 hydropower plants, Toachi Pilatón is the most vulnerable to the effects of climate changes.

One of the project's completed components produced the analysis of the vulnerability of the Toachi-Pilatón hydropower plant, one of the eight high priority hydroelectric plants as regards the effects of climate change, in order to generate guidelines for reducing vulnerability to climate change in this and other hydroelectric plants.

The study provided the following results for the Toachi Pilatón Hydropower Station:

- 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 and resulting in a clear reduction of water volumes available for generation in both of Toachi-Pilatón's water intake points.
- 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 point toward soil degradation in the basin, which produces, under the effects of climate change, an altered hydrological cycle with its resulting lower retention of sediments under extreme weather events, as well as a clear and observable increase of sediments in the basin in future periods. Today, the main driver of deforestation and degradation in the basin are related to accessibility, the expansion of pastures for livestock, and small-scale agriculture.
- The Toachi-Alluriquín hydropower station (which along with the Pilatón-Sarapullo plant forms part of the Toachi-Pilatón hydroelectric complex) is vulnerable, and has the least adaptive capacity of the group. Its susceptibility may lead to a decrease of up to 25% of its current annual projected

generation capacity, and it is the one that may be exposed to greater risk due to reduced flow and increased sediments.

- The Pilatón-Sarapullo hydropower station is the most vulnerable of the group, and requires an improvement of its monitoring system. Its susceptibility may lead to a decrease of up to 26% of its current annual generation capacity. It is exhibiting possible high risk due to decreased flow.
- As a result of the analysis, **we** found that Toachi's watershed has a high vulnerability in general, highlighting the areas of its headwaters and mouth, which coincides with a low adaptive capacity and thus with an increased vulnerability in these areas.
- The monitoring of hydro-meteorological variables within the plant's watershed has limitations in terms of quality and availability, generating less understanding of the behavior of water flows and sediment in the basin.

The hydroelectric plant Toachi-Pilatón is under construction and will begin operating in December 2015. The plant is located in the foothills of the Andes Mountains, so flooding of large areas is not expected. The construction of the plant has therefore not required involuntary displacement or resettlement of communities.

Against this background, the proposed adaptation measures will take into account comprehensive approaches to Integrated Watershed Management and Ecosystem-based Adaptation (EbA) (Lhumeau and Lamb, 2012) such as transverse lines of analysis, which would ensure that the basin's environmental and social systems can increase their resilience, reducing their vulnerability under the expected effects of climate change.

The project's implementation will mark a stage of conviction regarding the actions that must be carried out to ensure that the Ecuadorian State's investment in hydropower can be sustained under climate change scenarios. Under this context, the participation of engaged stakeholders, and their commitment will increase the basin's resilience. **As a result it will be obtain** the conservation of water resources and the generation of electricity **for the whole** country.

Relevant climate change scenarios according to best available scientific information

The Ministry of the Environment of Ecuador conducted **the** study that assesses the vulnerability of the Central Hydroelectric Toachi-Pilatón. For this diagnostic and projection of climate change study in the areas of interest, two lines of climate modeling were used:

- a) An assemblage of about 23 global models provided under the CMIP5 project (MAE, 2015b).
- b) The regional model REMO adjusted by the CIIFEN-MAE 2014¹

In order to capture smaller-scale processes, limited area climate models, nested within global models ("downscaling"), are used in such a way that it is assumed that local phenomena are based on large-scale patterns resolved in global models. This 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 modeling is carried out within three analysis periods (2016-2035; 2046-2065; 2081-2100). The climate scenarios analyzed 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. The periods and scenarios studied point toward a marked reduction in rainfall, which will result in a significant reduction in the flow available at the intake point. This situation results in lower electricity generation capacity by the hydropower station. Since all climate scenarios predict a decrease in rainfall, it is likely that all the hydropower complex's full capacities diminish, greatly reducing the hydropower station's generation factor.

The results obtained for temperature and precipitation readings in the feeder watershed were used as inputs for modeling flow and sediment through the SWAT model (Soil and Water Assessment Tool). The modeling 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 intake.

In this way, there is a large problem that will cause an increase in suspended solids which will transfer an increase in wear and tear on plant components exposed to these solids (mainly turbines), generating foreseeable and more frequent maintenance requirements. This, coupled with lower power generation, will have a negative impact on the hydropower station's economic balance sheet, and, by extension, **the country's national power grid**.

During the second half of the year water flows are **truly** low in relation to the station's capacity, being designed to harness the wet season's flow. In some months the flows can become so meager that, in practical terms, they will only satisfy the ecological flow.

(i) ¹ <http://www.remo-rcm.de/The-Regional-Model-REMO.1267.0.html>.

Economic social, development and environmental context in which the project would operate.

Ecuador belongs to the group of countries with the highest per capita availability of water in the world. However, this situation is fragile given future social, economic and environmental dynamics, including climate change. An appropriate sustainable use and management of water resources requires building policies and the implementation of strategies, programs and projects that contribute to an efficient Integrated Water Resources Management – IWRM and Ecosystem-based Adaptation - EbA, more so considering the harmful effects of climate changes in river basins, water courses and Andean ecosystems that regulate and store water.

The anomalous variability of rainfall patterns and the occurrence of extreme weather events alter the water balance. **These phenomena aggravated** by climate variability and change **cause** increased water stress in the watersheds around the country. Changes in rates of glacial melt, and changes in the storage and runoff patterns also affect the integrity of the high Andean ecosystems and affect river systems seated in their river basins, and **as consequence** negative impacts **could be** expected on productive levels in sectors such as agriculture, livestock (both with implications for food security) and forestry, as well as the water availability and quality for human consumption, irrigation, industry, and hydropower generation.

The Under Secretariat for Climate Change of the Ministry of the Environment of **Ecuador implemented** projects such as the Climate Change Adaptation Project (PACC). During its implementation, the PACC project conducted several vulnerability studies on the effects of climate change. The watersheds of the rivers Chone, Portoviejo, Babahoyo, Paute, Jubones and Catamayo were selected for the implementation of adaptation measures. Evidence shows that these river basins have a decadal variation of 0.2°C on average. In addition to this, a "WEAP Modelling on the Paute River (2010)" project was developed, which showed that the increase of sediments within a climate change context in the basin can compromise hydroelectric generation up to 5%. This is significant for further formulating hypothesis as to how climate change can affect water supply.

The results of these studies show in general terms a significant probability of change in normal weather patterns due to climate change within these watersheds. Therefore, actions and policies in the short and medium term are required to reduce the vulnerability of these areas to the effects of climate variability and change.

As a complement to the above, it should be noted that to date, the Undersecretariat for Climate Change of the Ministry of the Environment (SCC) leads the implementation of the CHECC Project which is focused on Vulnerability Analysis of Ecuador's Flagship

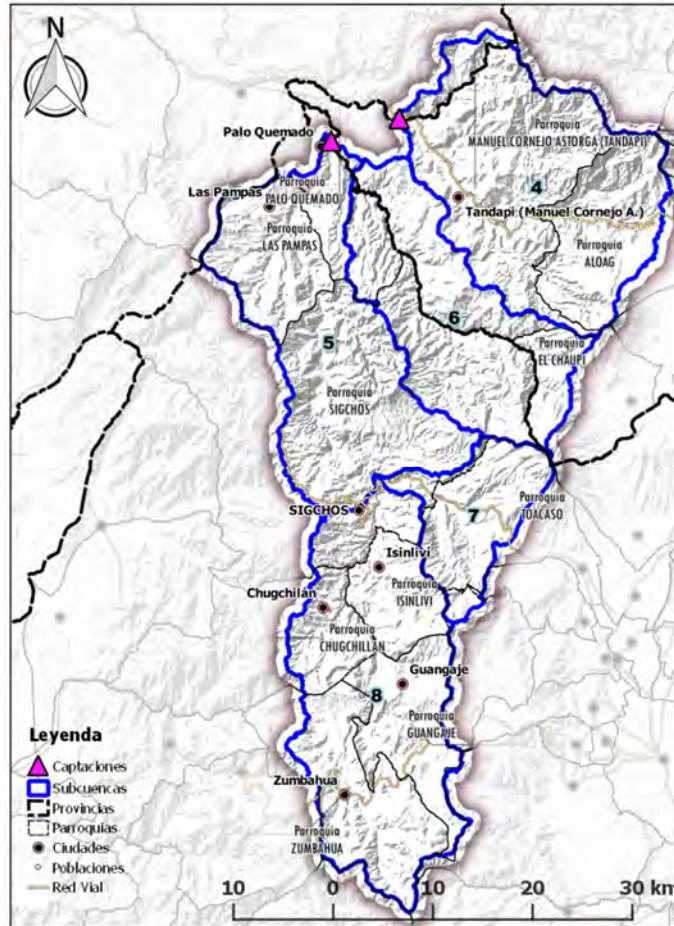
Hydroelectric Power Plants. Currently the country is implementing a process of change in its energy matrix.

The Hydropower Generation Expansion Plan provides, in the short and medium term, the installation of eight hydroelectric projects to expand the nation-wide, total installed capacity up to 7,873 MW with an estimated investment at least 6.01 billion US dollars. The goal is that by year 2016, 90% of the electricity generation matrix will consist of hydroelectric power plants. Thus, in the coming years more than 2,800 MW of installed capacity of hydropower will enter operation. It is estimated that this policy will reduce annual CO2 emissions by approximately 6.9 million tons.

In order to guarantee the sustainability of these infrastructures projects and the government investment, the CHECC project addresses the vulnerability analysis of the following hydroelectric power plants which are currently under construction: Coca Codo Sinclair, Quijos, Toachi Pilatón, Delsitanisagua, Minas San Francisco, Mazar Dudas and Paute Sopladora.

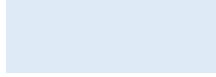
As stated above, the country promotes the development of initiatives and projects designed to improve the resilience of sectors and areas highly vulnerable to climate variability and climate change. In that context, Ecuador promotes this project in order to reduce watershed vulnerability, particularly in priority sectors, such as **Energy**, which is highly dependent on water for its normal functioning.

Hydroelectric Toachi-Pilatón is located in the Rio Blanco's sub-basin. This sub-basin is located to the southwest of the Pichincha Province, and covers an area of approximately 2,717 km². The main cantons [districts] that coincide with this sub-basin's area are: Santo Domingo, in the province of Tsachilas, Sigchos, and Pujilí in the Cotopaxi Province, and part of the Mejia Canton in the Pichincha Province. The intervention areas will be concentrated mainly in the Sigchos Canton and the parishes of Palo Quemado, Las Pampas, Aloag, Alluriquín, and Manuel Cornejo Astorga (Tandapi). The map below provides the political and administrative division of the Decentralized Autonomous Governments (DAGs) located in the basin, and in turn the population where in the main the interventions will be concentrated:



Map of the political-administrative division within the feeder sub-basins for the Toachi-Pilatón Hydropower Plant

Area of influence	Province	Canton	Parish under Intervention	Population centers within the area of intervention
PILATÓN SUB-BASIN	PICHINCHA	MEJIA	ALOAG	3.661
			MANUEL CORNEJO ASTORGA (Tandapi)	
TOACHI SUB-BASIN	SANTO DOMINGO DE LOS TSACHILAS	SANTO DOMINGO	ALLURIQUIN	9.725
	COTOPAXI	SIGCHOS	LAS PAMPAS PALO QUEMADO	1.943 1.030



SIGCHOS

7.933

Approximate Total Population**24.292**

Source: National Institute of Statistics and Census (INEC: acronym in Spanish), 2011

At the parish level there is population density of 0.048 to 0.121 inhabitants/ha (per hectare) in the urban parishes of Sigchos, Palo Quemado and Manuel Cornejo Astorga (Tandapi). In turn, the parish of Las Pampas and Alluriquín has a density of 0.121 to 0.171 inhabitants/ha. The density of these parishes varies between medium low, medium, medium high in comparison to other parishes in the basin's area. In this wise, it is clear that there is no large concentration of inhabitants per hectare. In the main, the areas of intervention for the adaptation measures do not have many people per hectare, which represents an opportunity to improve watershed management through the Integrated Watershed Management and Ecosystem-based Adaptation approaches.

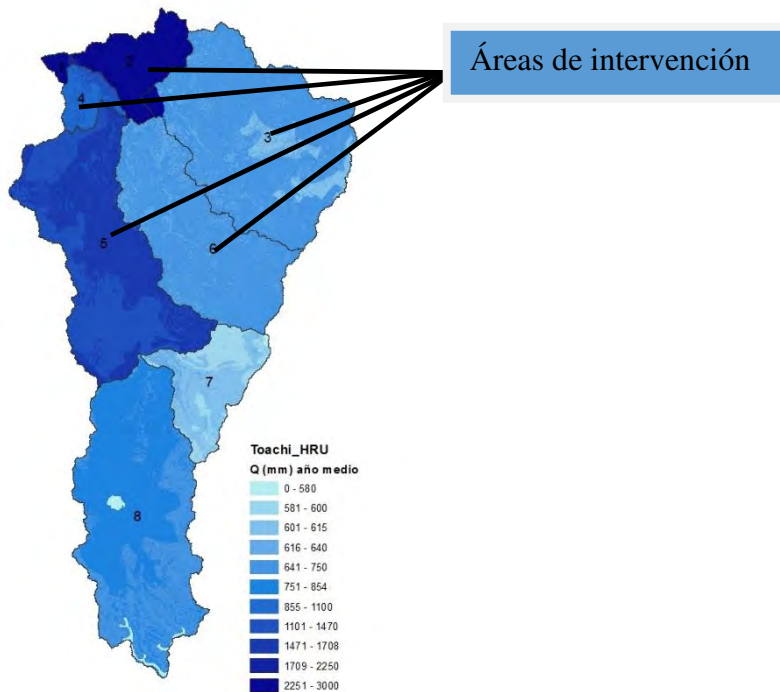
Also, there is a marked poverty index according to the Unsatisfied Basic Needs indicator, where on a scale between a low index of 0.00 and a high index of 1.00 of UBN on the UBNI, Sigchos and Tandapi parishes have between 0.82 and 0.91 UBN scores, and the parish of Las Palmas scores between 0.66 and 0.82 UBN, and the Alluriquín and Palo Quemado parish between 0.91 and 1.00 on the UBNI. The last two present the highest rates of unsatisfied basic needs. In this regard, it can be observed that there is a high index of Unsatisfied Basic Needs, an indicator that shows levels of poverty, and that tells us that the higher the UBNI, the higher the basin's ecological sensitivity in the basin as stakeholders pursue subsistence-level livelihoods that place pressure on the natural resources in their environment.

What is more, a medium level of illiteracy per parish can be observed, in comparison to other parishes located in the basin area. As such, Sigchos has an illiteracy rate of 11.3% to 22.1%, the highest in the comparison group. Las Palmas, Palo Quemado, Tandapi and Alluriquín have illiteracy rates of 7.4% to 11.3% of the population. As can be noted, the area of the basin has varying literacy levels, which has been considered within the criteria for assessing the basin's vulnerability within a social context.

In this sense, the Hydroelectric's presence represents a great opportunity for social and institutional actors to operate in the basin due to the fact that, in the short or medium term, it will become extremely necessary to maintain optimally the feeder watersheds, so as to sustain basin management in a coordinated fashion, both in the basin's upper reaches where highland plains, mountains and large and completely degraded tracts of

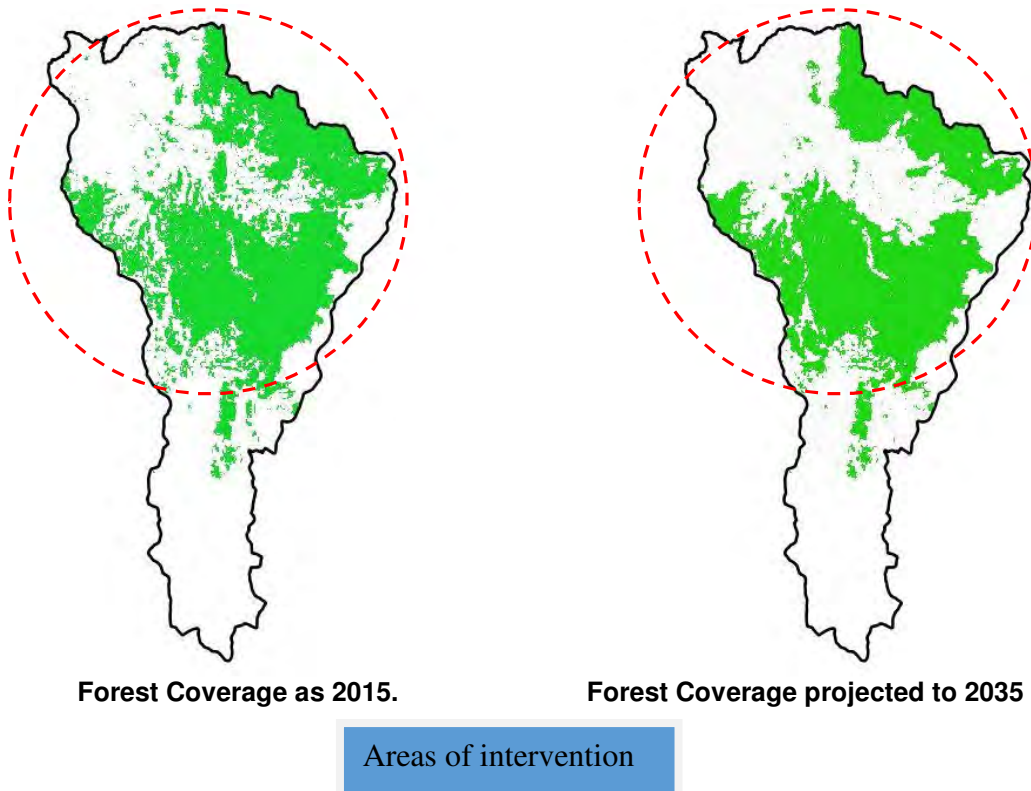
land are found, as well as in the mid and lower parts of the basin where the tree line begins.

As can be observed in the image below of the "Vulnerability Analysis of the Pilatón Toachi Hydroelectric Plant" project, the prioritized areas of intervention are found in the hydrological units that provide greater water volume to the hydropower plant, the very same ones which possess a high degree of ecological sensitivity to the effects of climate change.



Water volume contributions (mm) per Hydrological Unit at present.

In addition, in the images below developed by the National Programme UN - REDD Ecuador, the deforestation trend can be observed as projected to 2035 under the baseline scenario, where there is a strong impact in the change of vegetation over large areas of hydrological contribution within the watershed.



Project / Programme Objectives:

- i. List the main objectives of the project/programme.*

General Objective

To reduce the vulnerability of the Toachi-Pilatón Hydropower Plant's generation capacity, located in the southwest part of Ecuador's Pichincha Province, through the improvement of the adaptive capacity of human and natural ecosystems related to the hydropower plant's feeder basin through the Integrated Management of the watershed.

Specific Objectives.

Component 1. Enhance resilience and reduce vulnerability to climate change in the watersheds of the Pilatón and Toachi rivers through adaptive integrated watershed management.

Objective: Strengthen the resilience of local communities and reduce the hydrological basin's vulnerability to climate change.

Component 2. *Strengthening of the capacity to increase resilience to climate change among the local stakeholders living within the basin's area.*

Objective: Enhance local competency in relation to planning tools within the framework of the basin's integrated management.

Component 3. *Increase knowledge of the integrated management of hydrological watersheds, protective forest cover and measures for adaptation to climate change.*

Objective: Enhance the local climate information network, encourage the exchange of experiences of protective forest cover management and the implementation of measures for adaptation to climate change, and develop planning tools for basin management.

Project / Programme Components and Financing:

- i. Fill in the table presenting the relationships among project components, activities, expected concrete outputs, and the corresponding budgets. If necessary, please refer to the attached instructions for a detailed description of each term.*

Project/Programme Components	Expected Concrete Outputs	Expected Outcomes	Amount (US\$)
1. Implement adaptation measures to reduce vulnerability and enhance resiliency/adaptation capacity in the face of climate change through the adaptive integrated management of the watersheds for the Toachi and Pilatón Rivers.	1.1 Promote the incorporation of 1000 hectáreas of zones that contribute to regulation of the hydrological cycle which are <u>not</u> protected by any protective measure. (US\$ 60.000,00)	1.1 Stimulate the adaptive capacity and resilience of the sub-basins increasing the areas that guarantee the ecosystems benefits, contributing to the regulation of the hydrological cycle.	US\$ 1.570.000,00
	1.2 Introduce sustainable management systems for productive areas in 125 hectares. (US\$ 860.000,00)	1.2 Harmonize socioeconomic development in the sub-basins with the preservation of the hydrological resources, contributing to the control erosion and sediment flows.	
	1.3 Establish zones for the riverbank management in prioritized rivers and gorges. (US\$ 500.000,00)	1.3 Stimulate the restoration and enhancement of the Andean ecosystems and their environmental benefits and contribute to erosion control.	
	1.4 Construction of small-scale dams and panholes for sediment retention and improvement of water availability for local residents. (US\$ 150.000,00)	1.4 Via reduction of the river's slope and sediment storage, it is hoped to reduce the erosive power of floods and to increase the availability of water for local people.	
2. Strengthening of the capacity to increase resilience to climate change among the local stakeholders living within the basin's area.	2.1 Include the climate change variable throughout climate change plan, in local planning in at least three (3) DAGs. (US\$ 45.000,00)	2.1 Improvement of planning policies and tools at the parish and municipal level which promote measures aimed at increasing capacity for resilience.	US\$ 220.000,00
	2.2 Train 5% of stakeholders (1200 inhabitants) from the feeder sub-basins in the topic of climate change.	2.2 Raise awareness of and strengthen the capacity of local communities (linked to targeted sub-basins) to promote and	

	(US\$ 25.000,00)	implement adaptation to climate change actions.	
	2.3 Transfer know-how for climate change adaptation to technical personnel from the local DAGs located in the watershed. (US\$ 90.000,00)	2.3 Strengthen skills and transfer tools that allow the technical personnel from the DAGs and the hydropower plant to enhance resilience to climate change in the watershed.	
	2.4 Encourage dialogue among stakeholders responsible for basin resiliency management. (US\$ 60.000,00)	2.4 Raise awareness and strengthen local government's ability to promote and implement adaptation to climate change actions.	
3. Increase knowledge of integrated watershed management, protective forests and measures for adaptation to climate change	3.1 Produce a study on integrated management of the basin based on project experiences. (US\$ 75.000,00)	3.1. Have Recourse to a technical tool for local planning at the level of the hydrological basin, assembled with the participation of local stakeholders.	US\$ 315.000,00
	3.2 Generate management plans for two (2) protective forests. (US\$ 70.000,00)	3.2. Two protective forests have management plans that include the hydrological basin management and ecosystem conservation perspective.	
	3.3 Creation of a hydrometeorological network with the goal of measuring precipitation, water volumes and sediment flows. Four (4) hydrometric stations and three (3) meteorologic ones will be incorporated to the existing hydrometeorological network. (US\$ 120.000,00)	3.3 Understand the hydropower plant's adaptive capacity in response to volume variations and sediment flow through monitoring of water flows and sediment.	

Amended in November 2013

	3.4 Exchange of experiences and mechanisms for disseminating information. (US\$ 50.000,00)	3.4. Local stakeholders improve their knowledge of integrated management of basins, climate change and the implementation of adaptation to climate change measures.	
4. Project/Programme Execution cost			US\$ 199.975,00
5. Total Project/Programme Cost			US\$ 2.304.975,00
6. Project/Programme Cycle Management Fee charged by the Implementing Entity (if applicable) (8%)			US\$ 184.398,00
Amount of Financing Requested			US\$ 2,489,373,00

Projected Calendar:

Indicate the dates of the following milestones for the proposed project/programme

Milestones	Expected Dates
Start of Project/Programme Implementation	March 2016
Mid-term Review (if planned)	April 2018
Project/Programme Closing	March 2019
Terminal Evaluation	August 2019

PART II: PROJECT / PROGRAMME JUSTIFICATION

- A. Describe the project / programme components, particularly focusing on the concrete adaptation activities of the project, and how these activities contribute to climate resilience. For the case of a programme, show how the combination of individual projects will contribute to the overall increase in resilience.**

The components outlined in the proposal seek to integrate the largest possible number of actors in the management of the watershed where the Toachi-Pilatón project is located. Component 1 is related to intervention measures in the territory, which, through effective knowledge and management skills proposed in Component 2, strengthens the capacity of local actors to manage the basin, and the provisions in Component 3, allowing for management tools and better climate information for decision-making and the monitoring of conditions in the basin, to concretize the implementation of the project under the framework for complementation and execution of Component 3 for the integrated basin management. With this, project actors will assume responsibility for both the implementation of the measures in the territory (Component 1) and also for the strengthening of their capabilities (Component 2), which is enhanced through management tools and information generated for planning and decision-making (Component 3) under the integrated basin management.

Componente 1. *Enhance resilience and reduce vulnerability to climate change in the watersheds of the Pilatón and Toachi rivers through adaptive integrated watershed management.*

This component is the main focus of the proposal as this series of measures can improve the resilience of local communities and reduce the watershed's vulnerability to the effects of climate change. The measures will take into account the Integrated Watershed Management and Adaptation Ecosystem-based Adaptation (AbE: Spanish acronym) (Lhumeau and Lamb, 2012) approaches, tools that consider the condition of ecosystems and local participation as fundamental elements for increasing resilience and reducing the vulnerability of ecosystems and people to phenomena related to climate change. In order to define this component's intervention sites the results from

the study by the Ministry of Environment of Ecuador in Cuenca (MFA, 2015) will be taken into account. This study already proposes the areas for intervention based on the information generated for Toachi-Pilatón basin. The MAE has the appropriate mapping for the intervention sites. In addition to mapping information, the owners of most vulnerable farms and those with farms smaller than 10 hectares will be identified. Also people with low income and greater unmet basic needs will be selected, information that Ecuador has for the whole country.

1.1 Promote the incorporation of 1000 hectares of forest areas that contribute to the regulation of the hydrological cycle and which are not currently protected by any protective measure.

Since 2008, Ecuador has been running the Forest Partner Programme (**Programa Socio Bosque**), managed by the Ministry of the Environment of Ecuador. The program is directed at the conservation of forests and highland plains of importance for the preservation of biodiversity, and contributes to the reduction of deforestation in the country. This program provides economic incentives to rural populations and indigenous communities that voluntarily commit to the conservation and protection of their native forests, highland plains or other native vegetation. One of the project's goals is to facilitate the incorporation of conservation areas of importance to the Forest Partner Program. Boosting this mechanism ensures that those areas under threat of deforestation, and which are important for the maintenance of the hydrological cycle's regulation, have an outline for long-term protection once made a part of the program. The inclusion of areas defined as priorities for the maintenance of the hydrological cycle will be fostered, thus avoiding their deforestation and, therefore, the subsequent sediment flow into rivers. This demonstrates the project's commitment to contribute to and complement national ecosystem management initiatives. The implementation of integrated basin management allows the conservation of remaining natural ecosystems, further increasing resilience in the face of climate change.

1.2 Introduce sustainable management systems for productive areas in 125 hectares.

Ecosystem degradation is mainly related to the expansion of the farming and livestock-raising frontiers. These two sectors are also the main causes of land degradation in the Toachi and Pilatón river basins. As such, this measure aims at implementing sustainable soil and water management systems in the area of intervention's productive areas in order to reduce soil degradation and curtail the entry of sediment in these areas. To this end, the Ministry of the Environment of Ecuador has defined practices for sustainable land management to be applied in the areas of intervention. These defined practices are the result of the work of the various programs and projects developed by the Ministry of the Environment. Some of the measures considered for application to

agro-ecological crop management, sustainable farming, forestry (afforestation and reforestation), and habitat restoration (Segarra, 2014). These measures improve the adaptation of local residents, making their production systems more sustainable. The measures will be implemented, if possible, in areas adjacent to those areas where riverbank management is implemented. These two measures are complementary and also aid in improving relations with local residents.

1.3 Establish zones for the riverbank management in prioritized rivers and gorges.

The project's development framework starts from a perspective of integrated watershed management in which there are direct and indirect beneficiaries. The implementation of measures in conjunction with local residents makes them direct beneficiaries of those same measures. However, in accordance to the vulnerability of the watershed of the Toachi and Pilatón Rivers, the hydropower plant's location relies directly on the management of the basin, upstream to its intake. For this reason, the project proposes the implementation of measures.

In terms of cost effectiveness, traditional reforestation processes have difficulties in their implementation due to the high opportunity cost of land in Ecuador, therefore, reforesting large areas is a complex process. For this reason, the project proposes a process that prioritizes the river banks as the most suitable sites to establish conservation, management, and recovery processes for these areas. The implementation of riverbank management is an adaptive measure because it allows the development of multiple environmental, social and economic benefits. In hydrological terms, the recovery of these areas improves infiltration along river banks, and also reduces sediment inputs from agricultural areas, and the deterioration of riverbeds which contributes solids in the case of flooding events. Additionally, the implementation of riverbank zones advances the recovery of vegetation cover and, in turn, restores connectivity between fragmented areas so they are also considered as green corridors (Calles et al., 2012). The implementation of this measure uses tools such as active reforestation, passive reforestation, natural regeneration, and the fencing off of riverbanks. The reforestation done in this area will be carried with a mixture of species of commercial value, orchards, pastures, and species that favor water infiltration into the soil.

1.4 Construction of small-scale dams and panholes for sediment retention and to improve water availability for local people.

Taking into account that AbE also includes the construction of low-impact local infrastructure to improve the availability of water for productive activities, human consumption and flood control in ravines exhibiting levels of soil degradation and deforestation. The previous experiences of the PACC Project (Project for Adaptation to

Climate Change through an Effective Water Governance in Ecuador) will be applied in the areas of intervention. Among the measures to be implemented are the construction of small-scale dams and panholes for sediment retention and the reduction of the flow rate in small ravines. In both cases, the rocks used are taken from the riverbeds and when necessary concrete structures are implemented. These structures have been shown to help retain sediment and slow flows in ravines and rivers in mountainous areas.

Component 2. *Strengthening of capacity to increase resilience to climate change among the local stakeholders living within the basin's area.*

The empowerment of stakeholders and institutions to drive the basin's necessary adaptation to the effects of climate change is essential for the maintenance and replication of the project, as well as the effective implementation of actions and measures that can be generated for the responsible management of water resources.

In this sense, the stakeholders who will participate in the capacity building of this component will be selected when greater unmet needs and environmental vulnerability conditions arise in the project intervention areas and, in turn, on account of the project implementation, acquire the long-term commitment to continue the replication and sustainability of actions implemented. In addition, the technicians and decision-makers will be selected from those who are in local self-governing entities, the hydropower plant, and those responsible for the River Basin found within the project implementation area, fostering the mainstreaming of this knowledge in the implementation of plans, programs and projects within the framework of the watershed's Integrated Management. For this reason, these approaches to the task are proposed below.

2.1 Include the climate change variable, by means of climate change plans, in the local planning of at least three DAGs.

Decentralized Autonomous Governments - DAGs have authorities and responsibilities in the management of strategic resources, forest resources management, environmental management and pollution control. These faculties allow for the effective implementation of policies, strategies and measures to respond to climate change. In this regard, including the variable of climate change through Climate Change plans - CCP in the planning of the municipal DAG of Sigchos and the parish DAGs of Palo Quemado, Las Pampas, Alluriquín y Tandapi that have not yet included the variable of climate change in their Development and Zoning Plan – DZP, would ensure ownership of the problem and support for the progress that the project affords.

The Ministry of the Environment of Ecuador, the leading authority on the issue of climate change, promotes the institutionalization of action against the effects of climate change, for which reason the expected result is the improvement of policies and

instruments at the municipal and parish level in order to strengthen the DAGs governance, driving an increase in the resilience of the Toachi and Pilaton Hydropower Plant's power generation through the execution of activities within the framework of the DZPs' proposals.

Additionally, this will enhance the level of participation and coordination that can be created through **interinstitutional** sector and regional dialogue, in such a way, that planning and actions targeted at confronting climate change can be sustained through installed capacities, local planning and the possibility of their replication by other stakeholders in the basin.

2.2 Train 5% of stakeholders (1200 inhabitants) from the feeder sub-basins in the topic of climate change.

In order to ensure the continuity and permanence of the implementation processes for adaptation measures, it is important to design and strengthen awareness, education and training programs to enable the empowerment of the cultural management of water resources.

In this sense, the training will tend to generate dialogue and the transfer of knowledge, allowing among all the actors for an implementation that meets their needs, both those who receive the direct and the indirect benefits of the project's implementation, and that strengthen the resilience not only of the country's energy production, but the improvement of local stakeholders' adaptation to climate change.

2.3 Transfer know-how for climate change adaptation to technical personnel from the local DAGs located in the watershed.

It is essential the training and development of human resources in the DAGs and the Hydropower Plant to enhance the ability to adapt to climate change in the basin.

In this respect, ongoing training workshops are proposed allowing for capacity **skills** building and the transfer of know-how **to** technical staff of the aforementioned stakeholders, supported from the various instances of the State, promoting the empowerment of adaptation to climate change in the whole basin.

2.4 Encourage dialogue among stakeholders responsible for basin resiliency management.

Taking into account the importance of participatory and inclusive dialogue with the various stakeholders, in such a way that it can improve integrated watershed management, the project proposes creating a space with the various stakeholders that

allows for dialogue on needs and opportunities and that permits prioritizing areas for action. This professional *ad hoc* body will consist of representatives of different stakeholder groups, including the Ministry of the Environment (as the national environmental authority), the National Water Secretariat, provincial, municipal and parish DAGs, the involved hydroelectric plant, national and/or international non-governmental organizations, universities, other productive sectors, etc.

This *ad hoc* body's mission will be to promote dialogue between authorities, state agencies, social and productive sectors linked to the basin, with the opportunity to coordinate actions between all agents with a role in the basin (hydropower plant, DAGs, other companies, central government, among others). In this sense, the space will promote better joint action and management of the basin, with continuity over time, allowing for the implementation of effective measures against climate change.

Also, one of the objectives of this *ad hoc* body will be to explore funding opportunities, employing the financial mechanisms established in the regulations, with those that may generate common funding strategies in order to protect water resources.

It is extremely interesting that this body may take into consideration the following actions:

- Identification of involved agents and faculties, this will include a those members with a background in the basin, and economic agents.
- Workshops for the analysis of joint action opportunities.
- Joint Action Agreements.
- Determination of structure and funding
- Working group's membership
- **Others.**

Component 3. Increase knowledge of integrated watershed management, protective forests and measures for adaptation to climate change

3.1. Study on the integrated basin management based on the project's experiences.

This **proposed** is based on **the** Integrated Watershed Management and Ecosystem-based Adaptation schema. As such, a fundamental aspect for the integration of these schemata in the basin is to have a methodological and technical instrument that clearly defines the roles of the various actors taking into account the current legislation in Ecuador. Based on the spaces for dialogue that this proposal will be encourage (**Component 2**) and the adaptation measures adopted in the basin (Component 1), agreements for intervention in the basin will be established under an integrated

management perspective. At present the interventions carried out by the hydropower plant and local DAGs take into account their administrative boundaries and areas of influence in those places where hydropower structures were built. For this reason, the main objective of this outcome is to contribute to the design of a structure for watershed management and to support the Secretariat of Water (SENAGUA) in the establishment of a basin council which corresponds to its authority at a national level. The contribution to the adaptation of this result is clearly related to perceiving the basin as a space for planning that takes into account natural areas and not administrative boundaries. Additionally, this result will define a proposal for long-term financing based on local input and stakeholders in the watershed that will support the sustainability of adaptation measures to be implemented throughout the basin. Adaptation to climate change requires being able to rely on local political instruments built in a participatory manner for enhancing the resilience of the residents in the watershed area and reducing the watershed's vulnerability to the effects of climate change.

3.2. Management Plans for two (2) Protective Forests

Within the basin there are 3 protective forests (Toachi-Pilatón, Zarapullo and Lelia Rivers), which have contributed to the conservation of biodiversity, ecosystems and ecosystem services related to these areas. Unfortunately, most of these forests do not have management tools built with the participation of local stakeholders. Currently protective forests within the watershed are under pressure from changes in land use, mainly to be converted into low-yield livestock and agricultural areas. The proposal seeks to develop two (2) management plans for the Toachi-Pilatón and Zarapullo protective forests, which are the most extensive, and which will help consolidate the management of these areas within the basin. From the perspective of ecosystem-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 protective forests contributes to maintaining connectivity between local and national conservation areas, both public and private, and all related climatic and hydrological regulation services, such as sediment retention, infiltration and interception of horizontal rain, very important in these mountainous areas. In Ecuador, according to the law, protective forests fulfill the following functions:

- a. Conservation of soils and wildlife (main function);
- b. To be situated in areas that will permit the control of torrential rainfall events or the preservation of watersheds, especially in areas of low rainfall;
- c. Occupy the brow of the mountain or areas adjacent to the sources, streams or water reservoirs;
- d. Constitute windbreaks or protection for environmental balance;
- e. Be found in areas for forest hydrological cycle investigation;
- f. Be located in strategic zones for national defense; and,

- g. Constitute a defense factor for natural resources and infrastructure of public interest.

The instrument required to ensure fulfilling these functions are the management plans that help mainly in the definition of activities that can be staged in these areas and which provide benefits not only to the environment but also for local residents, such as spaces for the development of tourist activities. **Likewise, the instrument will allow on the basis of the learning generated in the Components 1 implementation of adaptation actions, and Component 2 capacity building, for the blending of actions in management once management plans are implemented.**

3.3. Climate change studies require information on climate, hydrology, sediments and land use in order to evaluate the ability to adapt to climate change. Due to the limited information in the basin on Toachi-Pilatón hydropower plant's contribution, it is necessary to establish a network of continuous monitoring of rainfall, flows and sediment. To comply with the aforementioned, the following activities are planned:

- a. Installation of meteorological and hydrological stations

There is currently a hydrometeorological network, run by the National Institute of Meteorology and Hydrology of Ecuador (INAMHI: acronym in Spanish). This project aims to extend INAMHI's hydrometeorological network with the goal of having better spatial coverage across the width of the basin. In conjunction with INAMHI the most suitable sites will be chosen for which there is no information. In this way, existing information gaps on the basin can be filled. Various meteorological and hydrological stations will be installed. The equipment will have the same features of that currently being used by the INAMHI. In this way, measurement errors are kept to a minimum in situ and there is a direct benefit from the experience gained in the handling of the equipment. Continuous monitoring of rainfall and flow rates, and other climatic variables should be daily or hourly. This will depend on the type of equipment to be installed. **Through the implementation of this measure, effective long-term monitoring can be done of the effects that adaptation actions have (Component 1) on the basin. At the same time, said climate information will allow for making informed decisions about the territory and with the active participation of the inhabitants, incorporating knowledge of the basin area's climatology as a part of their capacity building (Component 2). All this is connected in item c. Platform for the Evaluation of adaptation to climate change.**

- b. Measurement and monitoring of sediment flows

Three flow measurement stations for the installation of sediment samplers will be selected. The selected stations will be set up in the drainage area where

hydroelectric project's dam is located. At these selected stations for flow measurement water samples will be taken in order to determine the concentration of suspended sediments. The equipment to be used in relation to sediment samplers will be the same type that the INAMHI has been using. The monitoring of sediment will be done weekly during the dry season and three times a week during the rainy season, so the sediment load can monitor in the rivers during floods, periods of moderate and low flow, and dry summer months.

The information generated through the implementation of this measure will permit the evaluation of adaptation measures proposed in Component 1 in the medium and long term, and will reveal how effective the actions to be taken have been, improving the adaptive learning curve for residents and decision-makers in the territory. These tools are combined in item c. of this component, which seeks to inform and provide feedback on the performance of the entire project, as well as improving the climate and water information from the basin project.

c. Evaluation Platform for adaptation to climate change

The information generated on precipitation, flows and sediment will help to establish a database, which will be the initial platform for evaluation of the effects of climate change. The information generated in this project will help extend existing historical series generated by the INAMHI. The results of the analysis of the time series of flow and rain will help to establish trends over time and their relationship with variations in sediment. These results may be used to validate the hydrological and sediment modeling, and allow for the simulation of future scenarios. In addition, the results of the analysis of the rain-flow and its relationship to sediment load will allow for comparison with other environmental variables in the context of global change, such as changes in land use whose impact can have a direct influence on mitigation processes.

3.4. Exchange of experiences and mechanisms for disseminating information.

Due to the complexity of watershed management and the area it covers, it is important to have mechanisms for the exchange of experiences and the dissemination of information generated during the project and related initiatives within the basin. The project result intends for local actors participating in the project's various activities to become aware of the initiatives planned in the project intervention sites. The residents in the watershed, that will be the direct beneficiaries of the adaptation measures to be implemented, will be the first agents for disseminating the activities. Locally, the best mechanism for disseminating and replicating the measures is to be familiar with the experiences in which local residents are participating. In this context, field visits will take place between the different sites where measures are implemented given that not all

measures will be implemented in all the intervention sites. Finally, the experiences will be systematized and disseminated through manuals and guides for the implementation of measures which can be replicated throughout the basin. This result is very important for the sustainability of initiatives as it will allow local people to be clearly aware of the impacts of climate change, integrated watershed management and adaptation measures which can be done locally.

B. Describe how the project / programme provides economic, social and environmental benefits, with particular reference to the most vulnerable communities, and vulnerable groups within communities, including gender considerations. Describe how the project / programme will avoid or mitigate negative impacts, in compliance with the Environmental and Social Policy of the Adaptation Fund.

Institutional and other personal beneficiaries, (direct and indirect).

The watershed where the Pilatón-Toachi Hydropower Plant is located and which will be the Project's area of intervention presents various environmental, social and economic conditions. The determination of which parishes in the territory would be targeted for the implementation of measures was done by taking into account principally the environmental conditions relating to the provision of water and sediment entry areas.

Direct beneficiaries: Direct beneficiaries 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 beneficiaries are found:

- DAGs and their 24,292 inhabitants in the parishes of Manuel Cornejo Astorga (Tandapi) Alluriquin, Las Pampas, Palo Quemado and Sigchos benefitting from the inclusion of the climate change variable on planning and land use zoning, from generating a space for dialogue for the promotion of the basin's adaptive management, by the incorporation of hectares that are not currently protected, and the establishment of a hydro-meteorological network.
- 1200 inhabitants that will benefit from the strengthening of capacities.
- At least 25 technical staff from the DAGs will benefit from training and know-how transfer that adapt management to climate change.
- At least 200 stakeholders will benefit from the exchange of experiences.
- At least 60 residents will benefit from systems for the sustainable management of productive areas.
- At least 500 residents will benefit from the implementation of management zones along riverbanks, rivers and targeted ravines.
- At least 225 residents will benefit from the implementation of small-scale dams and panholes.

Indirect Beneficiaries: Indirect beneficiaries are defined as those persons or institutions that will participate in the **Project's** activities without directly receiving resources from the **Project**.

- Users of water drawn from this basin.
- 53.959 residents in the basin.
- All the users of electrical energy from the National Interconnected System.

In order to determine and ensure that the beneficiaries will be the most vulnerable, women and marginalized communities, the relation to plots in vulnerable areas will be a main criterion, that is, those which are less than 10 hectares, and whose beneficiaries have greater Unsatisfied Basic Needs, and a higher percentage of female composition. All this will be determined through census information obtained at the "census sector" level which is the most appropriate scale for determining the areas and beneficiaries where and among whom adaptation measures can best be implemented.

In this context the benefits derived from the Project's intervention in the basin can be resumed in the following:

- *Economic Benefits*

The improvement of incomes earned in the area focuses on the implementation of sustainable soil and water management systems for productive areas in the intervention areas. With this, productive systems will be stimulated through agro-ecological crop management, sustainable livestock raising, forestry (afforestation and reforestation), and habitat restoration. In this way, the inhabitants within the intervention areas, in addition to improving their livelihood, will be adapted to climate changes expected in the basin, mainly affected by lower precipitation and a significant increase in temperature, which could, without a comprehensive intervention, impair water production and thus lead to the detriment of agricultural production.

The **Project's** intervention represents in the long term maintenance or improvement in the face of the hydrological cycle's current conditions in the production of water volumes and sediments occurring in the basin. For this reason, in addition to ensuring the production of water volumes for power generation, which would avoid losses in investment and energy production, would also 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, which mainly affect the electromechanical equipment in the Toachi Pilatón hydropower plant.

The project includes within its intervention in Component 1 direct benefits in the improvement of productive capacity that will be obtained through adaptation measures. This will allow for better engaging in productive value chains, which in turn complies with the improvement production conditions, the preservation or enhancement of the river's flow and a decrease in its sediment load.

- *Environmental Benefits*

The **Project's** central components are aimed at intervention in the Adaptive Integrated Management of the Basin with a focus on ecosystems. **What** allows natural and man-made systems to be complementary by promoting the conservation of biodiversity, the maintenance and restoration of riverbanks, ecological connectivity, improved water quality, incorporation of unprotected new areas, and strengthening management of protective forests through management plans, by which major environmental benefits are sought once the adaptation measures have been implemented.

- *Social Benefits*

The inclusion, empowerment and leadership of stakeholders in implementing adaptation measures are key factors in the Project's success. In this sense, the creation of the social fabric, with an integrated approach between the different participation and decision-making levels among local, sector, civil society stakeholders, will be one of the main social benefits formed in the spaces for dialogue and the exchange of experiences with a territorial vision of the watershed, which is afforded by mainstreaming and improving resilience to the effects of climate change.

Capacity building with both the GADs and the communities should lead to an improved understanding of the climate phenomena and how they affect quality of life and productive systems. Thus, community participation based on their own experience enables organizational and institutional figures to be strengthened, by reducing vulnerability to extreme events and future climate variability risk.

Additionally, the understanding of climate phenomena through improved hydrological and meteorological monitoring will allow for the implementation of projects, programs and policies that permit beneficiaries the energy provided by the Toachi-Pilatón hydropower plant to maintain their daily activities. Also, this information will be a tool for more finely understanding the impacts of climate change on the basin's productive sector.

Taking into account that resources available for the project development are limited, the level of intervention in the Basin is limited to areas where adaptation measures with local residents will be established. The level of the Project's impact will be evaluated in

the long term once issues related to climate change and integrated watershed management become integrated into the development of local activities.

Greater stability, in the mid and long term, in electrical generation at the Toachi-Pilatón hydropower plant is an additional benefit **at a national level**.

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

In 2008 Ecuador initiated large investment in hydroelectric projects nation-wide. At present, eight (8) projects are in the building process, which are designed to reduce Ecuador's **dependency** on fossil fuel-based electrical generation. This, additionally, contributes as a country to the reduction in emissions of greenhouse gases due to the use of said fuels for electrical generation. The present proposal has as an aim that one of these investments in electrical generation being carried out by Ecuador, in this case the Toachi Pilatón Project, planned for 50 years, might maintain its effective output in the long term and, even more, in a climate change scenario. An important part of maintaining this investment is an adequate management of the watershed of the rivers that provide water for hydropower generation. Thus, a long-term, integrated management of the watershed will aid in maintaining the necessary flow, with good water quality and a lighter sediment load which can have **recuperations** for the hydropower plant's operation. The benefits for the hydropower plant in terms of investment in the project are only justified if the watershed's conditions can be maintained or improved. In this sense, the point of contact between hydroelectric generation and local development is the integral management of the watershed-based ecosystems where the direct and indirect beneficiaries may establish mechanisms for joint work and opportunities for dialogue at the level of river basin.

In the absence of the funding requested in this proposal, it would continue without the orientation of comprehensive watershed management and the investments made in the basin may not incorporate criteria for the basin's integrated management. Maintenance **cost** may, in turn, be increased due to the progressive wear and tear of the electromechanical infrastructure as a result of an increase in sediment load. In addition, the availability of flow would be affected if the degradation of the basin continues without any intervention, and therefore its ability to regulate the hydrological cycle would be affected. The project investment will be crucial to generate in the basin local capacity and necessary experiences to develop adaptation measures with social, environmental and economic benefits for local residents as well as for the people of Ecuador who receive electricity generated at the Toachi-Pilatón hydropower plant.

Due to the nature of the intervention and the extension of the basin or watershed, the measures adopted at the local level will be a reference for building long-term efforts and in a wider area. So, investment in this project will reduce training costs, preparation of the social fabric and future repetitions or applications of the project's experience.

In addition, the implementation of an Ecosystem based Adaptation management approach recognizes the present value of the conservation of ecosystems located in conservation areas within the basin such as protective forests. Effective investment in the conservation of these spaces and the remaining natural ecosystems will avoid future costs of their restoration and recovery processes, which tend to be higher and generate associated economic impacts.

Finally, the project investment in improving the availability of hydrological and meteorological information is essential for adaptation to climate change. The information generated is key to understanding the watershed's functioning, and to evaluating the climate's long-term behavior within the basin. The lack of information has high costs that cause climate information dependent decisions to lack local data and be based regional data or national interpolations. The operation of hydropower plant and local productive development require local information for an integrated adaptive management of the basin.

With these antecedents, and once the costs of implementing adaptation measures arising in the project have been established, it is important to mention that the project provides environmental, economic and social benefits, which without the intervention of MATCH project could not be obtained successfully, and that in turn these benefits match at least the amount budgeted for the implementation. Below are the costs and benefits that the project entails:

COSTS	BENEFITS
1.1 Promote the incorporation of 1000 hectáreas of zones that contribute to regulation of the hydrological cycle which are <u>not</u> protected by any protective measure. (US\$ 60.000,00)	1.1 Stimulate the adaptive capacity and resilience of the sub-basins increasing the areas that guarantee the ecosystems benefits, contributing to the regulation of the hydrological cycle.
1.2 Introduce sustainable management systems for productive areas in 125 hectares. (US\$ 860.000,00)	1.2 Harmonize socioeconomic development in the sub-basins with the preservation of the hydrological resources, contributing to the control erosion and sediment flows.
1.3 Establish zones for the riverbank management in prioritized rivers and gorges.	1.3 Stimulate the restoration and enhancement of the Andean ecosystems and their environmental benefits and

(US\$ 500.000,00)	contribute to erosion control.
1.4 Construction of small-scale dams and panholes for sediment retention and improvement of water availability for local residents. (US\$ 150.000,00)	1.4 Mediante la reducción de la pendiente del río y el almacenamiento de sedimentos se espera reducir la energía erosiva de las crecidas y aumentar la disponibilidad de agua de pobladores locales.
2.1 Include the climate change variable throughout climate change plan, in local planning in at least three (3) DAGs. (US\$ 45.000,00)	2.1 Improvement of planning policies and tools at the parish and municipal level which promote measures aimed at increasing capacity for resilience.
2.2 Train 5% of stakeholders (1200 inhabitants) from the feeder sub-basins in the topic of climate change. (US\$ 25.000,00)	2.2 Raise awareness of and strengthen the capacity of local communities (linked to targeted sub-basins) to promote and implement adaptation to climate change actions.
2.3 Transfer know-how for climate change adaptation to technical personnel from the local DAGs located in the watershed. (US\$ 90.000,00)	2.3 Strengthen skills and transfer tools that allow the technical personnel from the DAGs and the hydropower plant to enhance resilience to climate change in the watershed.
2.4 Encourage dialogue among stakeholders responsible for basin resiliency management. (US\$ 60.000,00)	2.4 Raise awareness and strengthen local government's ability to promote and implement adaptation to climate change actions .
3.1 Produce a study on integrated management of the basin based on project experiences. (US\$ 75.000,00)	3.1. Have Recourse to a technical tool for local planning at the level of the hydrological basin, assembled with the participation of local stakeholders.
3.2 Generate management plans for two (2) protective forests. (US\$ 70.000,00)	3.2. Two protective forests have management plans that include the hydrological basin management and ecosystem conservation perspective.
3.3 Creation of a hydrometeorological network with the goal of measuring precipitation, water volumes and sediment flows. Four (4) hydrometric stations and three (3) meteorologic ones will be incorporated to the existing hydrometeorological network. (US\$ 120.000,00)	3.3 Understand the hydropower plant's adaptive capacity in response to volume variations and sediment flow through monitoring of water flows and sediment.
3.4 Exchange of experiences and mechanisms for disseminating information. (US\$ 50.000,00)	3.4. Local stakeholders improve their knowledge of integrated management of basins, climate change and the

	implementation of adaptation to climate change measures.
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For the analysis of environmental and social benefits a comprehensive analysis is planned based on the information presented in the CHECC project, together with the intervention areas where multiple benefits arise, taking into account the MATCH project's potential activities, with which accurate information in the calculation of cost-effectiveness may be obtained.

D. Describe how the project / programme is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or sub-national development plans, poverty reduction strategies, national communications, or national adaptation programs of action, or other relevant instruments, where they exist.

One of Ecuador's advantages in relation to climate change is the articulation of public policies at all levels. The project is aligned directly with current national environmental regulations. The Constitution of the Republic of Ecuador (2008) contains two articles, 413 and 414, relating to Climate Change Management in the country which call for the adoption of appropriate and transverse measures for the mitigation of climate change and the protection of at risk populations. Additionally, the Constitution also recognizes the need to "Oversee land use planning of watersheds and encourage the creation of watershed councils, in accordance with the law."

The National Plan for Good Living 2013 - 2017, contextualizes, in its objective No. 7, climate change as a multisector problem of national scope that should be approached with programmatic actions which generate results in the short and medium term. Under that stated goal, Objective 7.10 proposes the "Implementation of measures to mitigate and adapt to climate change to reduce the economic and environmental vulnerability with emphasis on priority groups". Also, Objective 7.6 points at the need to "Manage water resources in a sustainable and participatory manner, with a focus on watersheds and ecological flows to ensure the human right to water."

One of the specific objectives of the National Climate Change Strategy 2012 - 2025 points at the need to "initiate action so that the performance levels of productive and strategic sectors and the country's infrastructure are not affected by the effects of change climate". In addition, among its other objectives is to "Manage water resources with a comprehensive and integrated approach by Hydrographic Unit, to ensure the availability, quality and sustainable use of water resources for the various human and natural uses, in the face of the impacts of climate change".

Additionally, the National Plan for Climate Change 2015-2018 establishes the Water sector as a priority for the country and establishes as a measure the "Analysis of the vulnerability of the flagship hydropower plants to the effects of climate change in Ecuador's seven sub-basins".

The project will also contribute to the fulfillment of the "National Planning of Comprehensive and Integrated Water Resources Management of Ecuador's Watersheds and Micro-basins", defined by Ecuador's Secretariat of Water. In addition, the project's implementation will take into account the environmental aspects concerning the protection of water sources and management of riverbanks, defined by the Law on Water, Uses and Resource Utilization, and its corresponding regulations.

Locally, the proposal contributes to the implementation of plans and programs for Development and Land Use Plans (DLUPs) defined by the parish and municipal DAGs for the project's intervention area with regard to the integrated management of watersheds, protection of biodiversity and restoration of degraded areas. As such, the project is aligned with all the instruments of national and local public policy according to current planning in Ecuador.

E. Describe how the project / programme meets relevant national technical standards, where applicable, such as standards for environmental assessment, building codes, etc., and complies with the Environmental and Social Policy of the Adaptation Fund.

The Ministry of the Environment of Ecuador is the institution responsible for the enforcement of environmental legislation at the national level. In the case of the implementation of measures requiring an environmental permit, the project will request the corresponding authorization, taking into account and complying with current local and national environmental regulations. Due to the fact that the adaptation measures will be implemented primarily in productive areas, at present the need for special permits for implementation is not contemplated. If necessary, the project will comply with local ordinances and planning that allow for the proper development of the Project. Additionally, the implementation of dialogue spaces for individual and institutional stakeholders is oriented to compliance with the Law on Water, Uses and Resource Utilization. What is more, as such, no local or national laws are violated by implementing the measures defined in the Project. On the contrary, the project contributes to compliance with current regulations for the environment, construction, participation, and planning in the applicable legislation.

In this sense, recognizing that the infrastructure projects required are small scale, and have a minimal impact, such as small-scale dams at various levels of the basin, all the

construction standards set forth both in applicable legislation as well as building codes and design of the Ecuadorian Service Standards – INEN, will be complied with, as well as that required by the Unified Secondary Legislation of the Ministry of Environment (TULSMA) text and as well as the ordinances within the DAGs, so that all requirements for this type of small-scale infrastructure are met. If necessary their applicability, the respective processes will be done with the competent authorities.

F. Describe if there is duplication of project / programme with other funding sources, if any.

At present the Under Secretariat for Climate Change (SCC) has several initiatives and projects at the national level on issues of adaptation to climate change. Since the SCC project will be the first initiative to be implemented at watershed level in accordance with the provisions of the National Plan on Climate Change to reduce the hydroelectric sector's vulnerability (MEE, 2015). In Cuenca the Ministry of the Environment is responsible for the management of the Ilinizas Ecological Reserve located on the eastern and western boundaries of the Basin. Additionally, the Ministry of the Environment has been developing the Forest Partner (Socio Bosque) program in the area which currently encompasses 2228 acres. As has been indicated, the Project seeks to increase forest areas within the Forest Partner Program as a funding mechanism for conservation within the Basin and the Pilatón and Toachi Rivers. The project will promote the inclusion of new areas on the part of the Forest Partner Program and will not assume the payment of the incentives on behalf of the Forest Partner Program, as such, this involves no duplication of funds.

On the other hand, there are activities inherent to the Environmental Management Plan (EMP) for the Toachi-Pilatón Hydropower Plant, which are oriented to the territorial development of communities located in the direct area of influence. The main drivers for these activities are found within the framework of basic services, productive development, road connectivity and infrastructure, support for health, and education. In this sense, within the line of productive development work, actions like the implementation of livestock, agricultural, and tourism microenterprises are promoted, as well as the implementation of the program of afforestation and reforestation. Once identified EMP action areas, expecting that the goal of these actions is to promote regional development as the hydropower plant's social and environmental responsibility, but not the preservation and conservation of water resources, and understanding that the actions to be carried out in this adaptation project are aimed at adapting the watershed to maintain water volumes, and that the areas of intervention are different the EMPs areas of intervention, it is concluded that there is no duplication of funding.

Within the recently approved instrument, "National Planning for the Comprehensive and Integrated Water Resources Management of Ecuador's Watersheds and Micro-

watersheds", a series of infrastructure interventions that promote the proper management and conservation of water resources in country's various basins can be noted, with uses for the various consumer, energy and productive sectors. In this sense, the project will provide a work product that is articulated and complementary to water **resources** planning in the basin, implementing a set of infrastructure that afford better control of water flows and sediments which could reduce the plant's generation output due to the effects of climate change.

The MATCH project will enable the various plans, programs and projects presented in the Basin, to have a vision of comprehensive watershed management, so that, both actions taken for the maintenance of flow and sediment control through conservation and improvement of productive activities in the watershed, as well as capacity building among local community stakeholders such as institutions and DAGs, including anticipated knowledge management, are not duplicated nor overlapped by activities undertaken by other programs and projects in specific vulnerable areas that have been identified through the information obtained.

Based on the above, the MATCH project proposes actions and measures for adapting to climate change within the watershed in areas untouched by the intervention of any of the aforementioned projects. Therefore, in no case is financing duplicated in the areas proposed by the project. Instead, the respective synergies are created as framed in national policy and per the Adaptation Fund in order to implement adaptation measures, ensuring sustainability and repeatability once the project is executed.

G. If applicable, describe the learning and knowledge management component to capture and disseminate lessons learned.

One of the project's results within Component 3 seeks specifically to spread and disseminate the experiences in climate change adaptation measures implementation. The space for dialogue, provided by Component 2, will be key for the exchange of experiences among stakeholders in the basin. In addition to local learning mechanisms identified in Component 3, the project will disseminate its results through the website of the Ministry of the Environment and the social networks with which the Ministry engages. The Ministry's policy is to maintain a page for each project within its main domain as a means of dissemination of the work and activities of each project. During project implementation, local technical team will record all events taking place and document the major advances for their inclusion in handbooks, manuals and promotional material. Monthly, the project's technical team will prepare a bulletin for electronic distribution to show the project's progress among its members, partners and local stakeholders. Through the website of the Ministry of the Environment the main results obtained in the project, especially technical documents, guides or manuals generated as a work product, will be published.

The project will present its progress in the local and national media as a means of reaching a wider audience. The Communications Office of the Ministry of the Environment and the head of communications of the Secretariat for Climate Change will be the focal points for coordinating interviews with local and national media.

The proposed adaptation measures are based on local experiences developed by the Ministry of the Environment and, as such, the measures adopted in this proposal will also lend themselves to replication within the basin and in other Ministry projects. Being a process of working with local communities, businesses, local governments, and other sectoral institutions, adaptation measures have a space for modification and adaptation to local conditions. Part of the learning the project will provide is precisely to take into account local conditions and their ability to adapt so that the measures may succeed locally. The working approach of the proposal that integrates the Integrated Watershed Management and Ecosystem-based Adaptation will be an experience that will contribute to management at the national level and make possible a demonstration of the link between hydroelectric generation and its reliance on an integrated management of the watershed.

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.

In Ecuador, the local planning processes are developed at different levels. Nationally, the National Plan for Good Living 2013-2017 is the framework on which planning takes place at the provincial, municipal and parish level. Each of these local planning processes occur with the participation of stakeholders and the defined programs are developed taking into account local environmental, social and economic conditions. This integrated planning process at all levels of government facilitates coordination with local governments. For the definition of adaptation measures presented in this proposal all the development and local land use plans have been reviewed. The measures defined in this proposal aim at strengthening local planning and **contributing** to attaining goals aligned with the country's development.

Additionally, the project in its study and preparation stage had the active participation of stakeholders in the energy sector, such as: Coordinating Ministry of Strategic Sectors, Ministry of the Environment, Ministry of Electricity and Renewable Energy, National Secretariat for Planning and Development, Secretariat of Water, CELEC's Hidrotoapi Business Unit, Agency for Regulation and Electrical Control, the National Institute for Energy Efficiency and Renewable Energy, and the National Institute of Meteorology and

Hydrology, which made possible the adaptation of the proposed interventions in terms of the local and national planning.

NOTE. A sample of the documentary record of consultations and actions for the dissemination of the Project's study and preparation phase are included (full documentation is available: (Land Use Planning and the Minutes of planning meetings). The cover for Land Use Plan of one of the participating administrative units is also included.


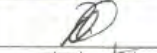

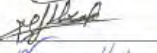





 Ministerio del Ambiente	MINISTERIO DEL AMBIENTE	
	Sistema de Gestión de Procesos	
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Versión: 02		Página: 1

EVENTO: Retraining: Medidas de Adaptación Proyecto CHECC

LISTA DE PARTICIPANTES

FECHA: 13/03/15

HORA: 8:50

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Por qué: Objetivos específicos que no se han considerados. Información no considerada en el estudio.

- Tema de líneas de transmisión que pasan por HP y comunidades
- El costo de uso de suelo es bastante alto para la ubicación de las torres

Quién: Actores clave con los que sería interesante socializar

- Banco Protector La Cascada
- Comités importantes en el sector del Atac y Bosta
- CELEC EP

Qué: Propuesta de actuaciones.

- Itinerario de trabajo de riesgos y servicios ambientales, para que las HPs se vean beneficiadas directamente

Cuándo: Cambios propuestos en el cronograma

Cómo: Elementos de interés para alcanzar los objetivos específicos.

- Propuestas de financiamiento hacia los operadores puede ser para deforestación de límites y fortalecimiento

Dónde: Zonas de especial interés para el desarrollo de actuaciones.

- Cerca del Atac
- Banco Protector La Cascada
- Cerca del Coca

Por favor no dude en dirigir cualquier inquietud a:
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**PLAN DE DESARROLLO Y
ORDENAMIENTO TERRITORIAL DE LA
PARROQUIA MANUEL CORNEJO ASTORGA -
TANDAPI
2012-2025**

Septiembre 2012

1

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

The scenarios of climate variability are related to changes in rainfall patterns, which are those that produce high impacts on social, environmental and economic systems. It is due to these effects that climate variability can limit and disrupt the normal and correct operation of these systems, or cause impacts on populations that depend on them.

The Ecuador's development is passing through an important moment due to changes in the production and energy matrix. This is based on the country's vision of sovereignty, conservation and sustainability. Natural resources are the key factor in economic and social development that the country brings to the fore, for which reason the regulatory framework that has been developed in the country facilitates the management of natural resources with a view to conservation and the efficient use of resources.

The Vulnerability Analysis of Flagship Hydropower Plants in the face of the effects of climate change indicates a clear risk that hydropower such as Toachi-Pilatón, may display negative changes in its energy production in future scenarios. These changes would represent about a 25% reduction in the energy generated, which translates into approximately \$ 700,000/year in the case of Toachi-Pilatón, and up to a 15 MM USD/year impact on the country's national grid (MAE, 2015b).

Taking into account the results observed, there is an urgent need to implement an Integrated Watershed Adaptive Ecosystem-Based Management in a participatory and coordinated manner with all stakeholders, so that the country not only can ensure the strong fiscal investment made in hydropower but also ensure the supply of clean energy, mitigating carbon emissions currently generated by power plants.

In this sense, adaptation measures proposed are intended to reduce the vulnerability of Toachi-Pilatón's energy production, while generating, in turn, direct benefits for the population, adapting their means of production to foreseeable climate changes facing the watershed, improving the understanding of climate and hydrological phenomena that occur in the basin, and showing the importance of working in a participatory and articulated environment among the various levels of governance and decision-making.

As such, the adaptation measures presented by the project are essential for the country's hydropower sector's adaptation to expected climate changes. **The commissioning of Toachi-Pilatón hydropower plant** will ensure the supply of renewable energy, and a concomitant decrease of about 430,000 tons/year of CO₂ **per the calculation done in "Defintion of the Potential for the Reduction of Greenhouse Gas Emissions in Ecuador in the Energy Sector" (MAE, 2015c)**. The project adapts in a comprehensive and ecosystem-based manner the entire watershed, setting a precedent in the conservation of water resources for hydropower generation.

For this reason, the proposal aims at focusing its investment efforts on the implementation of local adaptation measures so they may serve as references for other sites within the basin and elsewhere in Ecuador. The presence of hydropower in the basin with its related benefits derived from the reduction of emissions (mitigation) will only be possible with a territorial articulation of local stakeholders through the implementation of measures in the territory (adaptation). The project considers that the investment costs of these adaptation measures in the territory are the best alternative

for articulating processes for adaptation to climate change with local development. For Ecuador the implementation of this type of project is a great opportunity to demonstrate the clear link between adaptation and mitigation of climate change at the local level, and to demonstrate its strong commitment to the care of water resources and the conservation of ecosystems that allow the generation of renewable electricity. The investment made through this project, by guaranteeing the stability of Toachi-Pilatón's hydropower generation, will have an effect in the medium and long term through the reduction of carbon emissions avoided by this stability.

Taking into account the various components of the adaptation project that enable reaching project objectives in improving and maintaining flow and reducing the sediment load in the river for the better care of the beneficiaries and the hydropower plant, the fundamental intervention required to guarantee the greatest resilience to climate change in the contributing watershed can be observed below:

Component 1

The activities related to this component that improves resilience and reduce vulnerability to the effects of climate change, are:

- The incorporation of 1,000 hectares in areas that contribute to the regulation of the hydrological cycle with no form of protection, could not be done without project intervention due to the fact that once the vulnerability analysis of the basin is done, it is apparent that the areas requiring intervention do not have other activities that allow for increasing the areas that ensure ecosystem services and regulate the hydrological cycle.
- As a function of the vulnerability analysis conducted, it can be observed that the implementation of sustainable management systems for productive areas in about 125 hectares, will enable reconciling the socio-economic development of the sub-basins with the preservation of water resources. This analysis showed that there is no involvement of other projects or programs in the areas of intervention proposed by the MATCH project, as such, the intervention as regards the results obtainable with the project compared with the current state of the area depends on the project implementation.
- It has been observed that a large contribution to sediment control, and maintenance of flows can be achieved with the involvement of an adequate management of the banks of rivers and streams in the project area so that the Andean ecosystems are enriched and their erosion controlled. In this sense, the MATCH project is essential to achieve this goal, because there are no initiatives or similar actions in the study area.
- The construction of small-scale dams is a practice that the Undersecretary for Climate Change has driven through other adaptation projects in different areas of

the country. Experience shows that these small-scale infrastructure sites enable proper management of water resources in different parts of the basin, thereby reducing the slope of the river and retaining sediments and reducing the erosive power of floods. In the watershed area no adaptation measures are seen in this sense, thus incorporating the MATCH project is key to increasing the availability of water resources for the local people and the hydroelectric plant.

Component 2

The activities proposed in this component are essential for the MATCH project to be sustained and replicated in the medium and long term. In this sense activities must necessarily be articulated with area stakeholders both institutional and civilian.

- As a part of the management carried out by the Secretariat for Climate Change, the mainstreaming and the incorporation of these issues in planning and land use in different DAGs the country are done. The MATCH project is essential so that the DAGs located in the project area can participate in the inclusion of climate change variable, because the vulnerability analysis conducted indicates that to improve the adaptive capacity of the basin, a comprehensive intervention in the basin is necessary. This component allows that both the proposed actions as well as the programs and future projects be kept under a comprehensive line of watershed management.
- Given that the inhabitants of the watershed are impacted by inadequate watershed management, and in turn, by the future impacts climate change may have, training for the population is essential, so that they can not only increase their resilience, but also sustain and replicate good practices and actions developed in the project's Component 1. At present, the territory to be worked in has not undergone training in this topic, so the work that can be implemented is essential.
- Part of the comprehensive implementation proposed through the project activities is to strengthen the DAG technicians where adaptation measures are going to be implemented. At present, there is great demand to improve capabilities in topics related to climate change around the country, so in the study area it is essential that through Project MATCH, the respective knowledge necessary for the monitoring, verification and reporting of the activities in the best way is offered, through channels that are determined to that effect. In turn, the technicians and the project adapt these tools to serve the community.
- The articulation between stakeholders from different sectors who are cohabiting in the basin is essential for improving the actions proposed for development, and what is more, so that resource optimization efforts can be channeled in a proper order in function of the basin's integrated management. At present, there is no

space of this kind, so the project will strengthen joint action in implementation of adaptation measures.

Component 3

- As part of continuous improvement and the learning curve that has been obtained in implementing adaptation project in the country, it has been observed in many of the river basins there is no comprehensive management of the same, so the study area at the same time currently presents no comprehensive management to allow for local planning at the basin level basin built with the participation of different local stakeholders. This technical instrument will be built with management experience acquired during the implementation of the project, so as to ensure that the management mechanisms are consistent with the environmental, social and economic conditions of the area.
- In the basin area there are no Protective Forests with a management plan, so it is essential that through the project intervention these instruments be generated that allow authorities to work under a clear framework for the activities, and in turn, this be integrated into the integrated management of the watershed.
- To understanding the basin's resilience, and thus the hydroelectric plant and the inhabitants thereof, it is fundamental to know with great accuracy the variations in flow and sediment, so the improvement of the existing hydrological and meteorological network through the measuring stations will allow for improved management that can be done in the basin based on the availability of water resources without the prior implementation of these technical tools.
- At present there are no plans for mechanisms to disseminate information and exchange of experiences in the areas of intervention, so that through the implementation of Project MATCH, knowledge on integrated watershed management, climate change and implementing measures adaptation will be improved.

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

For the definition of the project components, current national and local planning was analyzed in order to reduce the possibility of duplicated efforts and rather to ensure that the project's defined components contribute to and complement local efforts for the fulfillment of the goals established in the local development plans in the context of a climate change scenario.

Project sustainability will be based on the permanent integration of actions taken by municipal and parish governments in the area of intervention regarding the implementation of the measures and the development of the activities slated for local execution. Local capacity building is a key element for attaining the sustainability of the measures adopted by the Project. Additionally, the Project will create a space for dialogue among local stakeholders who are active in the basin of the Toachi and Pilatón Rivers, taking into account integrated watershed management as a tool for local planning. This space for dialogue will allow stakeholders to share experiences and promote the development of adaptation measures at the local level based on the financing from the DAGs and complementary funds that can be raised to maintain long-term planned activities in the project and increase the number of beneficiaries within the watershed.

In the case of monitoring systems their future maintenance will be done with the involvement of the Toachi-Pilatón Hydropower Plant and the supervision of the National Institute of Meteorology and Hydrology (INAMHI).

In this sense, there are specific considerations, key factors and conditions that the project must be at the fore in order to ensure, from the outset, continuity and sustainability of outcomes and impacts, and adaptive processes initiated by the same project. For this reason, the MEE will lead a mechanism for permanent coordination and communication with sector entities, DAGs and others stakeholders. Therefore, efforts will be directed to:

- Ensure the design and implementation of adaptation measures that incorporate elements of Integrated Water Resources Management and ecosystem-based adaptation.
- Incorporate into the project's management key institutional stakeholders such as the energy sector, DAGs, nongovernmental organizations, and the private sector, with the task of regularly evaluating the effectiveness of adaptation measures implemented in the Project's areas of intervention and provide its management with feedback on the results.
- Drive the integration of adaptation to climate change management in the processes of design, construction, operation and control of the energy sector, especially in the hydropower sector and **others** associated conservation and/or management **watershed**.
- Promote effective mechanisms so that hydropower is managed under climate vulnerability **considerations** both in **their** decision-making and in its sectoral management.

- Ensure that project execution is inserted into the existing institutions in the hydropower sector, through the proposed adaptation measures, which in turn is inserted into the power plant's annual operational planning, thus strengthening the capabilities of various stakeholders at different levels, which will ensure that management and faculties are fulfilled effectively in the adaptation to climate change.
- Promote the continuity of the contribution of technical personnel whose skills are strengthened by the project, so that they become part of the institutions linked to it officially.
- Drive a sense of ownership of the project and of its actions by key stakeholders, so that the sustainability of the measures, policies, adaptive processes, etc., take hold and are sustained in institutional management, development planning at a local level, as well as the established legal order.

Among the lessons learned from other projects that have been undertaken in the framework of climate change adaptation in the MEE related to sustainability and the replication of adaptation measures, it can be noted that there are fundamental elements, such as the political will of institutions, local governments and stakeholders in the basin, where these measures will be implemented, the predisposition and high level of commitment on the part of beneficiaries, the availability of human, technical and economic resources to coordinate, lead and implement the project, as well as the sufficiency and accessibility of required scientific information, among others.

On the other hand, it is essential that there be time and planning for the minimum human and financial resources to complete successfully the closure of and withdrawal from the project. Therefore, the correct design of this stage is key, wherein, in turn, agreements between the various stakeholders involved are included and formalized for the sustainability of the project.

In this sense, taking into account previous experiences acquired in adaptation projects implemented in the territory with a perspective on water resource management, land use involving local stakeholders and a focus on gender, it will be essential that in the development of plan for Integrated Management of the Basin as a result of the implementation of project MATCH, a space for articulation between local stakeholders, the gender perspective, poverty reduction and action on vulnerable groups in the area be achieved, as well as the commitment in the availability of the necessary resources in order to continue actions and adaptation measures in the long run, and to replicate the experiences had by beneficiaries and stakeholders, maintaining an adequate coordination and cooperation in social and environmental benefits.

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

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
<i>Compliance with the Law</i>	X	
<i>Access and Equity</i>	X	
<i>Marginalized and Vulnerable Groups</i>	X	
<i>Human Rights</i>	X	
<i>Gender Equity and Women's Empowerment</i>	X	
<i>Core Labour Rights</i>	X	
<i>Indigenous Peoples</i>	X	
<i>Involuntary Resettlement</i>	X	
<i>Protection of Natural Habitats</i>	X	
<i>Conservation of Biological Diversity</i>	X	
<i>Climate Change</i>	X	
<i>Pollution Prevention and Resource Efficiency</i>	X	
<i>Public Health</i>	X	
<i>Physical and Cultural Heritage</i>		X
<i>Lands and Soil Conservation</i>		X

The Project's intervention and the measures defined therein have sought to minimize the risks that can arise from adaptation projects in the territory. The potential risks of intervention were analyzed according to criteria defined in the above table and it is considered that, once the project intervention in the field starts, special attention should be paid to issues related to local cultural and physical heritage. This is mainly because some waterfalls or sites in rivers can be places of cultural importance for local residents. However, this could be specified once field work begins. Another aspect to be taken carefully into account when implementing the measures is related to the conservation of soil and land. There are low risks in relation to this issue that can be mitigated if the measures are carried out in the field. These risks are limited to the intervention in existing agricultural and pastoral areas, and as such the expansion of these areas will not be supported. By contrast, the proposal seeks to make more efficient use of

agricultural and pastoral areas and promote the conservation of soil, forests and water resources within the basin.

Finally, the three components as a whole seek to reduce vulnerability and enhance the resilience of local communities in a perspective of integrated watershed management. As such, it is considered that the project fall within Category B, since there will not be large-scale adverse or irreversible social and environmental impacts. The intervention will be performed on specific areas, not extensive, with fully reversible and easily mitigated impacts and mainly to allow greater resilience and reduced vulnerability to the effects of climate change.

It should be emphasized that the hydroelectric Toachi Pilatón is not in operation yet, therefore the activities done to date are the implementation of infrastructure and electromechanical equipment. The plant is expected to be inaugurated in the coming months. In this sense, it is necessary to clarify that the project has a low impact given the altitudinal gradient that exists in the foothills of the Andes. The plant's electric potential does not present in its design the need to implement a dam involving the flooding of large areas, so that does not involve the displacement of indigenous or vulnerable communities due to hydroelectric project. In turn, the Electricity Corporation of Ecuador -a State Company - Hidrotoapi Business Unit possesses the environmental licensing corresponding to the project's phases, in which an assessment of the environmental and social impacts and a plan for environmental management, and a series of enabling documents related to the relationship with the community are developed, allowing it to operate according to the applicable environmental legislation. Therefore, the MATCH project has a category B, whereas this project is developed in the watershed that feeds the project, where there is no involvement of large-scale infrastructure, and although the direct beneficiaries are the population of the basin and also the hydroelectric, there are indeed different implementation processes between the constructive and operational development of the hydroelectric plant, with the development of Project MATCH.

PART III: IMPLEMENTATION ARRANGEMENTS

A. Describe the arrangements for project / programme implementation.

The Government of Ecuador through the Ministry of the Environment has given priority to mitigation of and adaptation to climate change in national policies, such as the Constitution and the National Plan for Good Living and the National Climate Change Strategy. The Ministry of the Environment (MEE) is responsible for the formulation and implementation of all adaptation to climate change measures at the national level. The

MEE, as lead institution for the management of climate change in the country, **works** together with the CAF (Development Bank of Latin America) to develop actions that contribute to the implementation of its national policies and strategies on climate change. The MEE will act as the **implementing agency** under the supervision of the Sub-secretariat for Climate Change and with the technical support of the provincial offices that have a presence in the watershed of intervention.

As previously mentioned, the project's intervention in the basin will be aligned with national and local planning policies and it will integrate a wide range of social, economic and institutional stakeholders for their implementation. The participation of all the territorial and institutional stakeholders according to their level of responsibilities is necessary to achieve the project's objectives and thus improve the ability to adapt and build resilience in the basin. Community participation will be essential to the success of the project and its integration in the project will be throughout the entire implementation process and will take into account the needs identified by local authorities and residents through the Development and Land Use Plans (DLUP).

Therefore, for the start of the project a cooperation agreement will be made between the MEE, the CAF, DAGs, and local participants as the principle responsible parties for project implementation in the territory. Local cooperation agreements between the MEE and parish governments will be signed according to the scope of activities to be implemented and their faculties as defined in the Constitution of Ecuador. In Ecuador, the decentralized autonomous governments (DAG) are decentralized institutions that enjoy political, administrative and financial autonomy, and are governed by the principles of solidarity, subsidiarity², equity, inter-regional integration and citizen participation. The corresponding cooperation agreements will be established under these principles.

Taking into account the jurisdiction of the Secretariat of Water (SENAGUA) in the planning of water resources in Ecuador, the respective coordination and necessary arrangements will be established with the Esmeraldas Watershed Territory where the watershed under intervention is located. SENAGUA's role is very important in the construction of watershed councils and the definition of activities within the "National Planning for Comprehensive and Integrated Management of Water Resources in the Basins and Micro-basins of Ecuador" to which the project seeks to contribute through its intervention in the basin.

(ii) ² **local self-determination/governance.**

Additionally, since the hydroelectric Toachi Pilatón is a fundamental stakeholder for the development of the proposal, a framework working agreement will be established for the coordination and implementation of activities under the perspective of integrated watershed management.

Specific agreements with the Ministry of Agriculture, Livestock, Aquaculture and Fisheries (MAGAP: acronym in Spanish) and the National Institute of Meteorology and Hydrology (INAMHI: acronym in Spanish) will also be established in matters relating to their faculties to avoid duplication of effort and interventions in the area basin.

At the local level, if necessary, agreements will be established with local farmers and residents of the project's respective areas of intervention especially at the level of producer associations.

In these cooperation agreements the roles and responsibilities of all stakeholders and involved institutions in the project will be defined in order to achieve institutional commitments and the coordination of anticipated project activities.

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

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

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

PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. Record of endorsement on behalf of the government³

<i>Lorena Tapia, Ministra del Ambiente del Ecuador</i>	Date: <i>July, 24, 2015</i>
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B. Implementing Entity certification

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans **National Plan for Climate Change 2015-2018; National Climate Change Strategy 2012 – 2025; National Plan for Good Living 2013 – 2017; National Planning of Comprehensive and Integrated Water Resources Management of Ecuador’s Watersheds and Micro-basins** (.....list here.....) and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.

Ligia Castro

^{36.} Each Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

<i>Dirección de Ambiente y Cambio Climático</i>	
Date: August, 4 th , 2015	Tel. and email:lcastro@caf.com +58.212.209.66.34:
Project Contact Person: María Carolina Torres	
Tel. And Email: mctorres@caf.com +571.743.73.68	

NOTES: The project calendar is tentative: its duration follows the planning of project activities. Dates must be confirmed by project's proponent and by Daniel.

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ADAPTATION FUND

Letter of Endorsement by Government

Government of Ecuador
Ministry of Environment

Quito, 24th July, 2015

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

Subject: Endorsement for Project *Reduction of the Toachi Pilatón hydroelectric plant's vulnerability to the effects of climate change with a focus on Integrated, Adaptive Watershed Management- MATCH.*

In my capacity as designated authority for the Adaptation Fund in Ecuador, I confirm that the above national project proposal is in accordance with the government's national priorities in implementing adaptation activities to reduce adverse impacts of climate change in hydro energy sector of Ecuador.

Accordingly, I am pleased to endorse the above project/programme proposal with support from the Adaptation Fund. If approved, the project will be implemented by CAF – Banco de Desarrollo de America Latina and executed by Ministry of Environment.

Sincerely,

Ms. Lorena Tapia
Minister of Environment