ADAPTATION FUND

AFB/PPRC.20/10
3 March 2017

Adaptation Fund Board
Project and Programme Review Committee
Twentieth Meeting
Bonn, Germany, 14-15 March 2017

Agenda Item 8 e)

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 “Increasing adaptive capacity of local communities, ecosystems and hydroelectric systems in the Toachi – Pilatón watershed with a focus on Ecosystem and Community Based Adaptation and Integrated Adaptive Watershed Management” was submitted by the Corporación Andina de Fomento (CAF), which is a Regional Implementing Entity of the Adaptation Fund.

10. This is the third submission of the proposal. It was first submitted at the twenty-sixth meeting of the Board and was not endorsed. It was re-submitted at the twenty-eighth meeting of the Board, and the Board decided to:

(a) Not endorse the project concept, as supplemented by the clarification response provided by the Banco de Desarrollo de America Latina (CAF) to the request made by the technical review

(b) Suggest that CAF reformulate the proposal taking into account the observations in the review sheet annexed to the notification of the Board’s decision, as well as the following issues:

(i) The proposal should provide more detail about the activities in each project output and component to define the elements of the project design – in other words, including details of the “how” outcomes will be achieved in addition to “what” is being proposed;

(ii) The proposal should provide a clearer link between the activities of conservation under component 1 and those related to sustainable farming under component 2;

(iii) The proponent should more clearly outline how it will engage, involve and benefit women and other marginalized groups;

(iv) The proposal should provide additional detail on the environmental and social screening, which is partially reflected in the matrix that was provided with the revised concept, to comply with the Environmental and Social Policy and the Gender Policy of the Adaptation Fund; and

(c) Request CAF to transmit the observation under item (b) to the Government of Ecuador.

(Decision B. 28/16)

11. The current submission was received by the secretariat in time to be considered in the twenty-ninth Board meeting. The secretariat carried out a technical review of the project proposal, assigned it the diary number ECU/RIE/Rural/2016/1, and completed a review sheet.

12. 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.

13. 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, a response table is also attached, explaining where and how the observations made by the Board when not endorsing the concept project document at its twenty-eighth meeting had been addressed by the proponent in the concept project document submitted for this meeting. The proposal is also submitted with changes between the initial submission and the revised version highlighted.

Project Summary

Ecuador – Increasing adaptive capacity of local communities, ecosystems and hydroelectric systems in the Toachi – Pilatón watershed with a focus on Ecosystem and Community Based Adaptation and Integrated Adaptive Watershed Management

Implementing Entity: *CAF*
Project/Programme Execution Cost: USD 180,000
Total Project/Programme Cost: USD 2,370,000
Implementing Fee: USD 119,373
Financing Requested: USD 2,489,373

Project Background and Context:

The project objective is to strengthen the adaptive capacity of the local population in the Toachi – Pilatón water system. The project focus on key drivers that will worsen the probable impact from climate change. The expected mid-term impacts are improved enabling conditions to sustain forest cover and sustainable small-scale farming in the area. In the long-term, it is expected that this will result in improved adaptive capacity. It is also envisioned that the lessons of the project are useful to other parts of Ecuador and other Andean countries.

Component 1: Conserve vegetative cover (USD 950,000)

The component includes activities that support the conservation of forests to secure key ecosystem services. Three outcomes will be generated by (i) expanding protection of existing forests under mechanisms of conservation and sustainable forest management, (ii) strengthening the management of existing protected forests and private reserves, and (iii) building artisanal sediment retention dams in key risk areas.

Component 2: Adapt farming practices to new climate change conditions (USD 900,000)

Component 2 will introduce sustainable farming practices to reduce the impact on the local water cycle and to adapt to probable conditions of reduced rainfall. One outcome will be generated by introducing best practices in about 250 ha of pasture land and 200 ha of crops (including sugarcane).

Component 3: Strengthen local capacities and share lessons (USD 340,000)

The component will strengthen private and public local capacities to implement adaptation measures. Three outcomes will be generated by (i) strengthening climate-monitoring, (ii) introducing adaptation to climate change into parish development and land use plans, and (iii) implementing public communication and education plans.

ADAPTATION FUND BOARD SECRETARIAT TECHNICAL REVIEW OF PROJECT/PROGRAMME PROPOSAL

PROJECT/PROGRAMME CATEGORY: Regular-sized Project Concept

Country/Region: **Ecuador**
Project Title: **Increasing adaptive capacity of local communities, ecosystems and hydroelectric systems in the Toachi – Pilatón watershed with a focus on Ecosystem and Community Based Adaptation and Integrated Adaptive Watershed Management**
AF Project ID: **ECU/RIE/Rural/2016/1**
IE Project ID: Requested Financing from Adaptation Fund (US Dollars): **$2,489,373**
Reviewer and contact person: **Daouda Ndiaye** Co-reviewer(s): **Mikko Ollikainen**
IE Contact Person: **Ligia Castro, Development Bank of Latin America (CAF)**

Review Criteria	Questions	Comments on 24 Jan 2017	Comments on 13 Feb 2017
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 that is particularly vulnerable to 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?	No. **CAR1:** Please provide the letter of endorsement of this project, signed by the Designated Authority of Ecuador.	**CAR1:** The letter of endorsement dated 9 February 2017 was provided for this project.

	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?	Yes, the proponent has clearly outlined the climate change impacts that have been documented and that are projected, and has outlined 3 components and several outputs. Many areas will require significant elaboration of the design during the fully-developed proposal stage to describe how outputs will be achieved. A few clarification requests are made: **CR1**: Please clarify and expand on the links between components. **CR2**: The review notes that additional detail has been added on component 1. Similarly, please add additional details for components 2 as well.	**CR1:** Mostly addressed. The fully-developed proposal should include more details on how outputs will be achieved and linked together during project implementation. **CR2:** Mostly addressed.
	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 and Gender Policy of the Fund?	Yes, mostly, however the proponent will be expected to outline, detail, and quantify the benefits of the project more extensively at the full proposal stage. **CR3**: Please provide more detail about how the project will directly benefit 14,000 is substantiated. **CR4**: Given the fact that this project will employ many ecosystem-based measures, please expand on the environmental benefits of the project. **CR5**: Please expand on how the project will engage, involve and benefit women and other marginalized groups.	**CR3:** Somewhat addressed but must be better substantiated at the fully-developed proposal stage. It cannot be assumed that the whole population of the project area is benefitting due to the development of a plan. **CR4:** Addressed **CR5:** Somewhat addressed. The fully-developed proposal must include a more thorough plan of how women and marginalized groups will be involved and will benefit from the project.

	4. Is the project / programme cost effective?	Requires clarification. **CR6**: Please summarize the results of Annex 9 and include it in section C, including rough cost estimates to the extent possible.	**CR6:** Addressed with the understanding that a more detailed analysis is planned for project preparation.
	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?	Yes, the project aims are in alignment with the relevant national strategies and plans. For the fully-developed proposal, however, the analysis should more comprehensively cover the NDC among other documents.	
	6. Does the project / programme meet the relevant national technical standards, where applicable, in compliance with the Environmental and Social Policy of the Fund??	Yes, however more information on the full application of laws and standards will be required at the fully-developed stage.	
	7. Is there duplication of project / programme with other funding sources?	No, however more details will be required at the fully-developed stage, including other projects underway from which the current project can draw upon.	
	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. However, more detail will be expected within the fully-developed proposal.	
	9. Has a consultative process taken place, and has it involved all key stakeholders, and vulnerable groups, including gender considerations in compliance with the Environmental and Social Policy and Gender Policy of the Fund?	Yes, consultations were held and a report was provided in the Annex. However, a few issues remain to be clarified. **CR7**: In addition to assessing the main gender issues in the project areas, please include a brief plan for how gender considerations will be taken into account in the project.	**CR7:** Not addressed.
	10. Is the requested financing justified on the basis of full cost of adaptation reasoning?	Mostly addressed, however more details will be required at the fully-developed stage.	

	11. Is the project / program aligned with AF's results framework?	Yes	
	12. Has the sustainability of the project/programme outcomes been taken into account when designing the project?	Mostly addressed, however more details will be required at the fully-developed stage.	
	13. Does the project / programme provide an overview of environmental and social impacts / risks identified, in compliance with the Environmental and Social Policy and Gender Policy of the Fund?	Yes. It is understood that an Environmental and Social Management Plan (ESMP) will be prepared as part of the submission of the fully-developed proposal.	
Resource Availability	1. Is the requested project / programme funding within the cap of the country?	Yes. The requested budget is $2,489,373. Another project was approved by the Board and is currently implemented by the World Food Programme for a budget of $7,449,468. Combined, the two projects will amount $9,938,841 which is below the cap of $10 million.	
	2. Is the Implementing Entity Management Fee at or below 8.5 per cent of the total project/programme budget before the fee?	Yes, 5%	
	3. Are the Project/Programme Execution Costs at or below 9.5 per cent of the total project/programme budget (including the fee)?	Yes, 7.3%	
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, in compliance with the Gender Policy of the Fund?	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 and Gender Policy of the Fund?	N/A	

	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, in compliance with the Gender Policy of the Fund?	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	

Technical Summary	The proposed project aims to address main drivers of deforestation and degradation in four sub-basins in Toachi- Pilatón and enhance local communities' adaptive capacity to the adverse effects of climate change. The project is presented coherently and combines policy, training, and ecosystem-based measures to address acute climate stressors in the region. A number of corrective action request (CAR) and clarification requests (CRs) were made to clarify key details of the project, including clarifying the linkages between components, the scope of benefits of the project and its cost effectiveness. The final technical review finds that most issues were resolved sufficiently for the concept proposal phase but notes that many areas will require significant elaboration of the design during the fully-developed proposal stage to describe how outputs will be achieved, benefits of projects will be assessed and evaluated, and how compliance with the Adaptation Fund's Environment and Social Policy and Gender Policy will be achieved.

	The following observations are made: a) The fully-developed proposal should include more details on how outputs will be achieved and linked together during project implementation; b) The fully-developed proposal should more extensively outline, detail, and quantify the benefits of the project, including a more thorough plan of how women and marginalized groups will be involved and will benefit from the project; c) The fully-developed proposal should provide a more detailed analysis of the project's cost effectiveness, adaptation reasoning and how the sustainability of the project outcomes has been taken into account when designing the project; d) The fully-developed proposal should include a brief plan for how gender considerations will be taken into account in the project.
Date:	18 February 2017

RESPONSE SHEET PROVIDED BY CAF TO ADDRESS THE OBSERVATIONS MADE BY THE BOARD AT ITS 28TH MEETING

ADAPTATION FUND

ADAPTATION FUND BOARD SECRETARIAT TECHNICAL REVIEW OF PROJECT/PROGRAMME PROPOSAL

PROJECT/PROGRAMME CATEGORY: Regular-sized Project Concept

Country/Region: **Ecuador**
Project Title: **Increasing adaptive capacity of local communities, ecosystems and hydroelectric systems in the Toachi – Pilatón watershed with a focus on Ecosystem and Community Based Adaptation and Integrated Adaptive Watershed Management**
AF Project ID: **ECU/RIE/Rural/2016/1**
IE Project ID: Requested Financing from Adaptation Fund (US Dollars): **$2,489,373**
Reviewer and contact person: **Daouda Ndiaye** Co-reviewer(s): **Ming Yang** IE Contact Person: **Ligia Castro, Development Bank of Latin America (CAF)**

Review Criteria	Questions	Comments on 22/8/16	Comments on 6/9/16
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 that is particularly vulnerable to 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	Yes, but minor clarification is requested. The importance of the proposed interventions is clear, however, the project would benefit from a more explicit description of the	

	capacity to the adverse effects of climate change and build in climate resilience?	climate change impacts that the project is aiming to address. **CR1**: Please clarify which particular climate change impacts the project is addressing, including by including relevant information from assessments and projections that are cited in the project document, and how the proposed interventions address those impacts. **CR2:** The structure of the project appears coherent. However, for the concept stage, additional detail would enable a stronger technical review of the intended scope of each outcome. Please add additional details for each outcome and output in the initial description of the project to define the scale, locations (to the extent possible), and types of activities that are envisioned. Particularly: **CR3**: Please also provide more details about the ways that the project will identify the target areas for protection in Component 1 (modelling, mapping, and/or participatory approaches), how issues related to land tenure will be resolved, and what management or regulatory mechanism will be used to sustain the conservation of these areas. **CR4**: The use of the Socio Bosque approach is welcomed – please clarify if the involvement of private sector partners has been secured.	CR1: Addressed sufficiently for the concept stage. CR2: Somewhat addressed, some additional detail has been provided but not expanded to explain how outcomes will be achieved. Text has been expanded. CR3: Addressed – the level of detail provided should be reflected in the project document as well. CR4: Addressed, with the expectation that more information will be supplied at the full proposal development

	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?	Yes, mostly, however the proponent will be expected to outline, detail, and quantify the benefits of the project more extensively at the full proposal stage. **CR5**: Please clarify how beneficiaries will be selected for the project, and how this will be sensitive to marginalized groups, indigenous people and women.	CR5: Somewhat addressed provided a much more thorough analysis at the project preparation phase. More consideration should be given to marginalized groups and women, however. More explanation has been introduced in the document.
	4. Is the project / programme cost effective?	Requires clarification. The project invests in low-cost ecosystem-based measures and presumably will enhance the resilience of people, ecosystems, and other stakeholders in the region. However, the section is too simplistic and does not fully justify the cost-effectiveness of the proposed program. **CAR1**: This section should compare the proposed intervention (and the intended outcomes of each component) with alternate adaptation options to achieve the same result to determine if the investment is cost-effective. To the extent possible, the project should provide evidence on the return on this investment. **CR6**: Pleases quantify the scale and scope of the sub-bullets in paragraph 46.	CAR1: Not addressed. This section should compare the proposed intervention (and the intended outcomes of each component) with alternate adaptation options that will likely achieve the same results (strengthening the conservation of about 230,000 ha of forest area and benefiting about 14,000 people). If data is missing, please use assumed data, and state clearly assumptions of the data. It is not possible to provide an analysis of return on the investment at this stage. Annex 9 was introduced to show alternate actions that had been consideres. CR6: Addressed

	5. Is the project / programme consistent with national or	Yes, the project aims are in alignment with the relevant national strategies	

	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?	and plans.	
	6. Does the project / programme meet the relevant national technical standards, where applicable, in compliance with the Environmental and Social Policy of the Fund?	Mostly. The project will comply with current regulations however the list of regulations should be more extensive and should refer to any relevant assessments that will be done. **CR7**: Please clarify any relevant regulations and standards for with respect to land rights and tenure.	CR7: Addressed, however additional analysis of how the project will apply these laws would be useful.
	7. Is there duplication of project / programme with other funding sources?	Not likely, however, the proponent has not outlined how the current proposal will learn from or build upon the projects listed. **CR8**: Please comment on what lessons or resources the project will build upon.	CR8: Addressed.
	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. However, more detail will be expected within the fully-developed proposal.	

	9. Has a consultative process taken place, and has it involved all key stakeholders, and vulnerable groups, including gender considerations?	Yes, consultations were held. However, it is not clear how the consultations have informed the design of the project. **CR9**: Please provide information on outcomes of community consultations,	CR9: Somewhat addressed, however a more complete plan for how gender
		clarifying how the proposed project responds to local community needs, as well as how the consultations informed the design of the project. Please also comment on how gender considerations were taken into account, as well as how other vulnerable groups such as indigenous peoples were consulted and included in the project design as appropriate.	and vulnerable groups' considerations will be addressed should be provided. Expanded paragraphs 68-74 do not address gender issues in Ecuador that are related to the project, or that were alluded to on page 26. The text was expanded. Also a stakeholder analysis was added (Annex 8).
	10. Is the requested financing justified on the basis of full cost of adaptation reasoning?	Not entirely. This section should outline the full cost of adaptation by component. **CR10**: Please include assessment of the project relative to a baseline for each component.	CR10: Addressed
	11. Is the project / program aligned with AF's results framework?	Yes, potentially. **CR11**: Please quantify the figures in the Framework Table on pages 22 and 23.	CR11: Addressed.
	12. Has the sustainability of the project/programme outcomes been taken into account when designing the project?	Possibly. **CR12**: Please expand on what kind of actions, specifically, will lead to sustained stewardship of forest areas, and how coordination platforms will be maintained beyond the lifetime of the project.	CR12: Addressed.

	13. Does the project / programme provide an overview of environmental and social impacts / risks identified?	Somewhat. **CR13**: As the proposal has already identified that "Further analysis will be needed on gender issues, the role of women in the farms and local organizations is not clear at the moment", this is contradictory with the statement that no further assessment is required for compliance with the	CR13: Somewhat addressed, however the screening information does not appear to reflect a complete assessment, or the information provided in the environmental and social risks analysis matrix. The text was expanded and a screening matrix was added (Annex 7).

		ESP. Please provide a more complete assessment of potential risks that might result from the project, as well as a category of risk (A, B, or C) and additional assessments that will be done in the preparation of the full project document.	
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, 7.6%	
	3. Are the Project/Programme Execution Costs at or below 9.5 per cent of the total project/programme budget?	Yes, 4.8%	
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 Guidance document for Implementing Entities on compliance with the Adaptation Fund Environmental and Social Policy, for details.	N/A	
	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?	N/A	
	Does it include at least one core outcome indicator from the Fund's results framework?		
	10. Is a disbursement schedule with time-bound milestones included?	N/A	

Technical Summary	The proposed project aims to address main drivers of deforestation and degradation in four sub-basins in Toachi-Pilatón and enhance local communities' adaptive capacity to the adverse effects of climate change. The initial technical review found that the project was presented coherently and combined policy, training, and ecosystem-based measures to address acute climate stressors in the region. However, the project, while clear, lacked certain details to fully define and outline the scope, scale, and on-the-ground impact of the project. The following corrective action requests were made: **CAR1**: This section should compare the proposed intervention (and the intended outcomes of each component) with alternate adaptation options to achieve the same result to determine if the investment is cost-effective. To the extent possible, the project should provide evidence on the return on this investment. The following clarification requests were made: **CR1**: Please clarify which particular climate change impacts the project is addressing, including by including relevant information from assessments and projections that are cited in the project document, and how the proposed interventions address those impacts. **CR2:** The structure of the project appears coherent. However, for the concept stage, additional detail would enable a stronger technical review of the intended scope of each outcome. Please add additional details for each outcome and output in the initial description of the project to define the scale, locations (to the extent possible), and types of activities that are envisioned. Particularly: **CR3**: Please also provide more details about the ways that the project will identify the target areas for protection in Component 1 (modelling, mapping, and/or participatory approaches), how issues related to land tenure will be resolved, and what management or regulatory mechanism will be used to sustain the conservation of these areas. **CR4**: The use of the Socio Bosque approach is welcomed – please clarify if the involvement of private sector partners has been secured. **CR5**: Please clarify how beneficiaries will be selected for the project, and how this will be sensitive to marginalized groups, indigenous people and women. **CR6**: Pleases quantify the scale and scope of the sub-bullets in paragraph 46. **CR7**: Please clarify any relevant regulations and standards for with respect to land rights and tenure. **CR8**: Please comment on what lessons or resources the project will build upon. **CR9**: Please provide information on outcomes of community consultations, clarifying how the proposed project responds to local community needs, as well as how the consultations informed the design of the project. Please also comment on how gender considerations were taken into account, as well as how other vulnerable groups such as indigenous peoples were consulted and included in the project design as appropriate.

	CR10: Please include assessment of the project relative to a baseline for each component. **CR11**: Please quantify the figures in the Framework Table on pages 22 and 23. **CR12**: Please expand on what kind of actions, specifically, will lead to sustained stewardship of forest areas, and how coordination platforms will be maintained beyond the lifetime of the project. **CR13**: As the proposal has already identified that "Further analysis will be needed on gender issues, the role of women in the farms and local organizations is not clear at the moment", this is contradictory with the statement that no further assessment is required for compliance with the ESP. Please provide a more complete assessment of potential risks that might result from the project, as well as a category of risk (A, B, or C) and additional assessments that will be done in the preparation of the full project document. The final project review finds that the revised proposal has resolved several of the clarification requests made in the initial technical review. However, several fundamental issues remain to be fully resolved before the concept can be endorsed. The proposal fails to sufficiently address the clarifications requests made in the initial review, and defers too many issues to the full proposal development. The following observations are made: a) The proposal should provide more detail about the activities in each project output and component to define the elements of the project design – in other words, including details of the "how" outcomes will be achieved in addition to "what" is being proposed. In cases where data is not available, the proponent should include the assumptions made as well as the plan to verify certain features in the design of the fully-developed proposal, b) The proponent should more clearly outline how it will engage and involve women and other marginalized groups, and c) The proposal should provide additional detail on the environmental and social screening, which is partially reflected in the matrix that was provided with the revised concept, as well as an explanation of the plan to fully comply with the ESP of the AF during the fully-development proposal preparation

Date:	**6 September 2016**

ADAPTATION FUND

PROJECT/PROGRAMME PROPOSAL

PART I: PROJECT/PROGRAMME INFORMATION

Title:	Increasing adaptive capacity of local communities, ecosystems and hydroelectric systems in the Toachi – Pilatón watershed with a focus on Ecosystem and Community Based Adaptation and Integrated Adaptive Watershed Management
Category:	Regular project/Programme
Country:	Ecuador
Type of Implementing Entity:	Regional Implementing Entity (RIE)
Implementing Entity:	CAF Latin America Development Bank
Executing Entities:	Ministry of Environment (MAE)
Amount of Financing Requested:	2.489.373,00 (in U.S Dollars Equivalent)

Project / Programme Background and Context:

1. The present project concept focus on the Toachi – Pilatón water system. This is a 2,154.42 km^2 drainage basin, were about 74,000 people live (Table 1). Toachi - Pilatón is a system of two drainage units that originate in the steep western slope of the Andes, and flows downhill to merge in the Blanco river. The Toachi – Pilatón is the southernmost subbasin of the Esmeraldas river watershed (Ecuador ´s fourth largest watershed); it covers 10% of the Esmeraldas drainage basin.
2. The Toachi drainage unit has four subbasins (Map 1 in Annex 3). The Toachi river is formed by several tributaries, most of them originating in the paramos (> 3,000 metres above sea level) within the Ilinizas Ecological Reserve[1] (e.g., río Las Juntas, río Negro, río Zarapullo). The Pilatón drainage unit is about a fourth of the size of the entire system. The Pilatón river is also formed by high altitude tributaries, some of them also originate in the Iliniza reserve (e.g., río Negro). However, both the Toachi and Pilatón rivers have a large contribution from tributaries that accumulate and channel water from the forests located on the steep hills.
3. The lower part of the system is humid with annual precipitation above 2,000 mm/year (Table 2). In contrast, the upper part of the Toachi drainage unit is much drier. In Sigchos, the annual rainfall in 2012 was about 1,130 mm. There are two marked seasons, a rainy season between December and May, and a dry season between June and October (Figure 1).

[1] Created in 1996, it covers 149,900 ha.

Table 1. Population in the Toachi – Pilatón system.

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

NA = Not available, but it is known to be very small
Source: Ecuador Population and Housing Census 2010.

Table 2. Precipitation in five meteorological stations of the Toachi – Pilatón system.

Station	Data series (years)	Annual precipitation (mm/year)	Monthly minimum (mm/month)	Monthly maximum (mm/month)
Alluriquin	1980-1993	2288.3	43.2	398.5
Toachi AJ Pilatón	1967-1985	2745.8	64.8	451.7
Palo Quemado	1965-1995	2126.8	55.5	326.4
Las Pampas	1985-2006	2126.8	33.9	353.0
Sigchos	2012	1130.4	5.2	247.60

Source: INAMHI meteorological yearbooks.

4. Three provinces and five cantons share the elements of the Toachi – Pilatón water system. Local communities depend mostly on extensive farming. On the Toachi side, the main activities are subsistence agriculture and extensive cattle farming. In the area of Palo Quemado, farmers cultivate sugarcane to produce panela (unrefined whole cane sugar); there are about 450 ha of sugarcane plantations, 98% of the harvest is used to produce panela (GADPRPQ, 2013). Panela is more profitable than other cultivars, but its artisanal production is based on the use of local trees for firewood. Each farmer uses about three trees per week to cook and reduce the sugarcane juice. On the Pilatón side, extensive cattle farming and subsistence agriculture is common. Commerce and small family restaurants predominate along the Aloag – Santo Domingo road (part of route E20). This is the main road which connects the country´s highlands and the coast; it runs along the west bank of the Pilatón river.

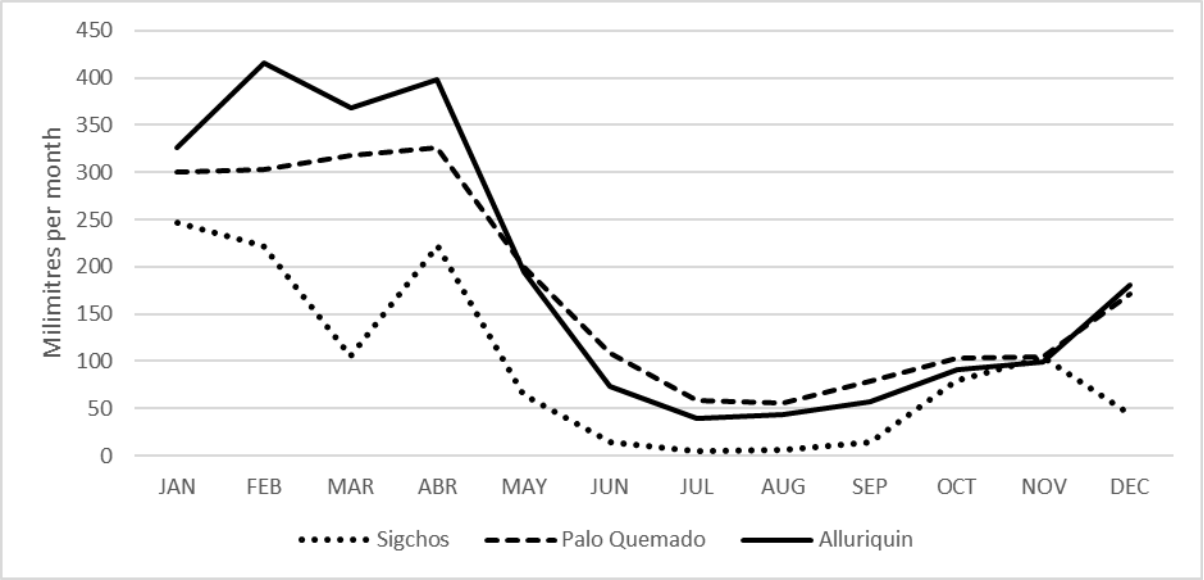

Figure 1. Monthly precipitation in three stations of the Toachi – Pilatón system. Sigchos is located in the upper part of the Toachi unit (2,880 masl) (precipitation data from 2012). Palo Quemado is in the lower part of the Toachi unit (ca., 1,100 masl) (average 1965-1995). Alluriquin is in the lower part of Pilatón unit (ca., 739 masl) (average 1980-1993).

5. The population has very high levels of poverty by unsatisfied basic needs. In 2010, four parishes located in the upper part of the Toachi unit had poverty levels above 98% (Figure 2). Even parishes with more developed economic activities like Palo Quemado, Alluriquin, Manuel Cornejo Astorga and Aloag had poverty levels well above the national average. In the same line, the levels of illiteracy are above the national level (Figure 3). The highest levels of illiteracy are also concentrated in the upper part of the Toachi unit.
6. In the lower part of the drainage system, mainly along the hillsides, it is common to have frequent landslides mainly during the rainy season. The area along the Pilatón river has high risk of both landslides and flooding (Jiménez, 2013; Proaño, 2015). Landslides are frequent along the Aloag – Santo Domingo road. Younes & Erazo (2016) found that landslide susceptibility along this road is related to active erosive processes, soil condition and rainfall between 1,500 and 1,750 mm. Road closures and traffic restrictions produce important economic losses and access problems to local communities. On April 2015, the road was closed for 20 days and isolated the locality of Tandapi. Landslides and flooding are aggravated during El Niño conditions[2]. During the 2015 / 2016 El Niño, there were frequent and large landslides along the Aloag – Santo Domingo road. Only in April 2016, there were about 25 landslides. In addition, on 26 April 2016, the Damas river flooded the locality of Alluriquin (739 masl), as a consequence four people were killed and 80 houses were damaged (15 destroyed).

[2] El Niño is the warm phase of El Niño Southern Oscillation (ENSO), recurrent planetary climate phenomenon. El Niño produces an extreme increase in rain and floods in Ecuador. In contrast, La Niña (cold phase of ENSO) produce very dry conditions and drought in Ecuador.

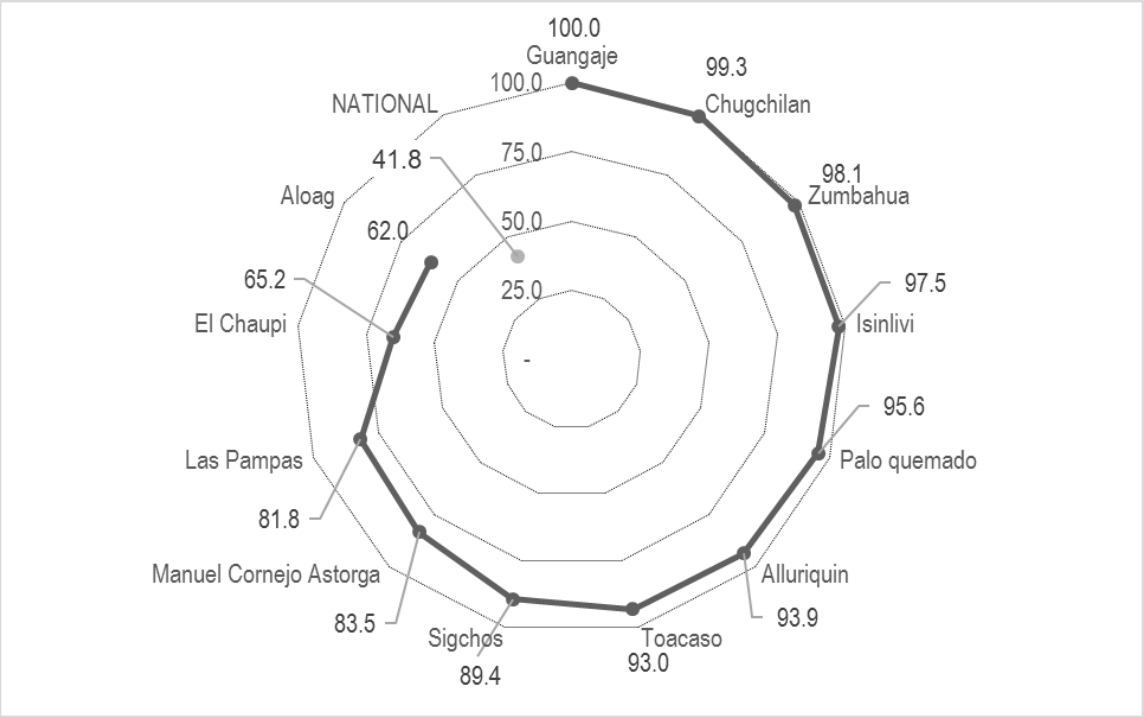

Figure 2. Poverty by unsatisfied basic needs in the parishes of the Toachi – Pilatón water system (2010 census).

7. The hillsides in the lower part of the drainage system maintain large areas of natural and intervened montane cloud forest, which are important for the water cycle and biodiversity (Map 2). The rest of the system is mostly used for agriculture and extensive cattle farming. The forest cover is mostly included in two Protected Forests[3]: (1) Toachi – Pilatón (BP156) and (2) Zarapullo (BP165). The Toachi – Pilatón Protected Forest was created in 1987, and is a large area of about 212,000 ha. The Zarapullo Protected Forest (BP165) was created in 1986, it covers 21.585 ha. In addition, there are several private reserves that are trying to develop services like trail hiking and bird watching. The forest area has a high biodiversity conservation value. There are populations of puma (*Puma concolor*) and the spectacled bear (*Tremarctos ornatus*), which are classified, respectively, as vulnerable and endangered in Ecuador´s IUCN red list of threatened species. The main threat to these species are habitat loss caused by deforestation, and hunting by farmers. In addition, a major part of the drainage system is an Important Bird and Biodiversity Area[4] (IBA).

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

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

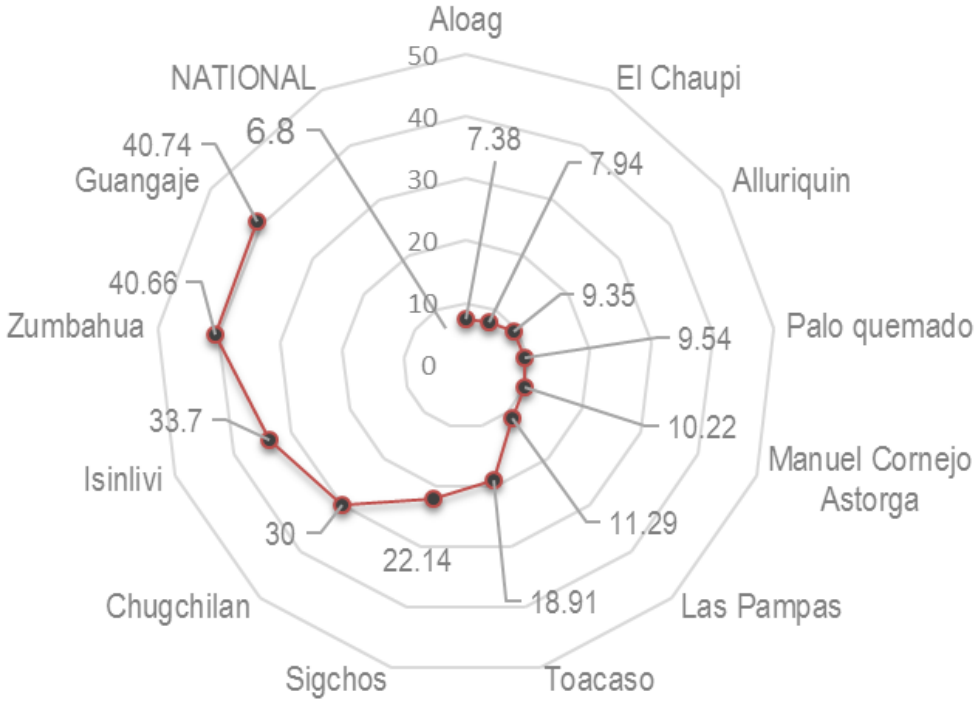

Figure 3. Percentage of illiteracy in the parishes of the Toachi – Pilatón water system (2010 census).

8. A hydropower plant is being built in the lower part of the Toachi – Pilatón system (i.e., HIDROTOAPI), and it is expected to initiate operation during 2017. It has two turbine systems, one based on the Toachi – Alluriquin confluence planned to produce ca., 204 MW, and the other based on the Pilatón – Sarapullo confluence planned to produce ca., 49 MW (Map 1). The total energy production will be 254.4 MW.
9. In 2014, the Ministry of Environment (MAE) analysed the climate change risk in the watersheds where major hydroelectric plants are based[5]. In the Toachi – Pilatón system it was found that:
    I. 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 (Map 3).
    II. 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 (Map 4). Today, the main drivers of deforestation and

[5] Project "analysis of the vulnerability of flagship hydropower plants to the effects of climate change" (CHECC). The project was executed by MAE in collaboration with Ministry for Coordination of Strategic Sectors (MICSE), Ministry of Electricity and Renewable Energy (MEER), National Water Secretariat (SENAGUA), National Meteorological and Hydrological Institute (INAMHI), and the Electric Corporation of Ecuador (CELEC).

degradation in the basin are the expansion of pastures for livestock and small-scale agriculture.

10. For the previously mentioned diagnostic and projection of climate change study in the areas of interest, MAE used two lines of climate modelling:
    - An assemblage of about 23 global models provided under the CMIP5 project (MAE, 2015), and
    - The regional model REMO adjusted by the CIIFEN-MAE 2014.
11. In order to capture smaller-scale processes, limited area climate models, nested within global models ("downscaling"), were used in such a way that it is assumed that local phenomena are based on large-scale patterns resolved in global models. This work employs the regional high resolution climate model REMO-RCM (Max Planck Institute for Meteorology in Hamburg) under the framework of the CORDEX project. The modelling was carried out within three analysis periods (2016-2035; 2046-2065; 2081-2100). The climate scenarios analysed with the REMO model are the three representative pathways of concentration which, in order of emissions levels, are: CPR2.6, RCP4.5, and RCP8.5.
12. The periods and scenarios studied pointed towards a marked reduction in rainfall, which will result in a significant reduction in the flow available at the intake points of the hydroelectric plant.
13. The results obtained for temperature and precipitation readings in the feeder watershed were used as inputs for modelling flow and sediment through the Soil and Water Assessment Tool (SWAT) model. The modelling indicates that the sediments, under the effects of future climate change scenarios, will increase to about twice the current level in the hydropower station's water intakes.

The adaptation challenge and barriers

14. Climate change will affect local communities in the Toachi – Pilaton water system by reducing water provision for human consumption, farming production and hydroelectric energy production. Figure 4 summarise the situation and the interaction with human pressures.
15. MAE has found that the Toachi – Pilatón water system will be strongly affected by climate change, it is foreseen that future changes in climate conditions will result in an overall marked reduction of rainfall. In addition, it is anticipated that climate change will produce stronger and more frequent ENSO events (Cai et al., 2014; Cai et al., 2015). Therefore, during El Niño conditions heavy rainfall will exacerbate landslides, erosion, river sedimentation and floods. But, during La Niña conditions, there will severe drought. These changes, alone, will be sufficient to alter the structure of the native montane cloud forests, which capture cloud moisture and feed streamflows. However, ongoing human pressures will exacerbate the impacts of climate change. The two main drivers are deforestation and soil erosion.
16. In the lower part of the water system, deforestation is caused by expansion of extensive agriculture and cattle farming. Farmers invade the forests and riversides[6] mainly to expand grazing areas for cattle and subsistence agriculture. Another factor which contributes to deforestation is that sugarcane farmers depend on firewood for artisanal panela production.
17. In general, farmers use inadequate agriculture practices which produces soil depletion, this reduces production and motivates further expansion of the agriculture frontier. All this contributes to soil degradation, soil erosion, and a reduction of vegetated areas.

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

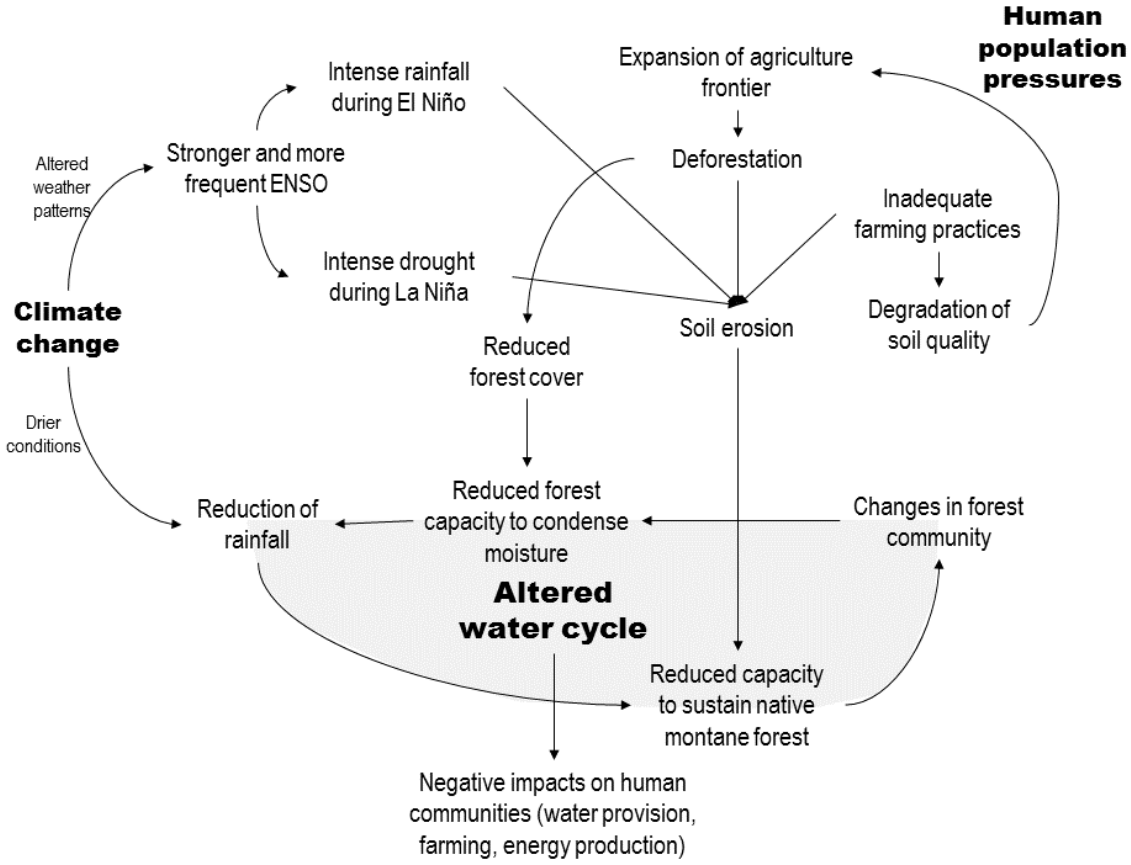

Figure 4. Conceptual diagram of climate change impacts on the water cycle of the Toachi – Pilaton water system.

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

19. Adaptation to climate change is a major challenge for local communities. The main barriers that limit adaptation in the lower basin of the Toachi – Pilatón water system are:

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

    b. Local development plans do not incorporate adaptation measures. Local plans (i.e., parishes and municipalities) mention climate change, but do not have specific actions to adapt living conditions to the future scenarios nor to take action to address key drivers like deforestation, land use change and invasion of riversides.

    c. Local production is based on extensive farming practices. Most farmers have small plots (≤20 ha per plot) with very low yields and, in general, use inadequate agriculture practices. In Palo Quemado ca., 50% of the farmers only have subsistence production.

Cattle farmers use extensive grazing; cattle produce about 7 litres of milk / day. It is common to clear forests to expand the grazing and agriculture areas. Sugarcane farmers clear forests to obtain firewood to produce panela. They indicate that firewood is every time more scarce and difficult to obtain.

d. Forest areas are not protected. The large protected forests, that are public property, are not managed and guarded. Therefore, extensive areas have been invaded and cleared to establish farms. Land tenure is an additional related issue, because invaders claim possession rights to the municipal and central governments. Private landowners of forest areas also face pressure from illegal farmers. The extent of the invaded area is unknown.

e. Limited climate-related information. The monitoring of hydro-meteorological variables within the watershed has limitations in terms of quality and availability, generating less understanding of the behaviour of water flows and sediments in the basin. The National Meteorological and Hydrological Institute (INAMHI) has eight meteorological stations in the Toachi - Pilatón water system (Map 5), but only two (i.e., M0362 Las Pampas, M0363 Sigchos) are operational.

20. The present project will contribute to address these barriers by developing practical adaptation actions to strengthen the resilience of local communities in the lower part of the Toachi – Pilatón water system (i.e., subbasins 1, 2 and 3 indicated in Annex 3). Key lines of action will be:

    a. To conserve forest cover, to sustain the hydrological cycle and prevent as much as possible a reduction of rainfall, and to protect hillsides from erosion.

    b. To introduce sustainable farming practices to increase the yield per hectare, concentrate production in less space and therefore reduce the expansion of the agriculture frontier, soil erosion and deforestation.

    c. To mainstream adaptation into local development plans and engage the local population by increasing awareness of the impacts derived from climate change.

Table 3 summarise specific actions to address the key barriers that have been identified (paragraph 19).

Table 3. Proposed actions to address the key barriers that limit adaptation in the lower basin of the Toachi – Pilaton water system.

Main barriers that limit adaptation in the lower basin of the Toachi – Pilaton water system	Project actions to address the main barriers
Local population not fully aware of climate-related impacts.	To implement a public communication and education plan on the five parishes of the lower basin of the Toachi – Pilaton water systems (output 7).
Local development plans do not incorporate adaptation measures.	To work with parish councils to mainstream climate change adaptation into the parish development plans of the five parishes of the lower basin of the Toachi – Pilaton water systems (output 6). The five parishes are: (1) Manuel Cornejo Astorga, (2) Aloag, (3) El Chaupi, (4) Palo Quemado, and

Main barriers that limit adaptation in the lower basin of the Toachi – Pilaton water system	Project actions to address the main barriers
	(5) Las Pampas.
Local production is based on extensive farming practices.	To work with local farmers to introduce best practices to reduce deforestation and land degradation. Implement together with local farmers demonstration pilots to show the practical application of best farming practices (output 4). The key groups to work with are cattle and sugarcane producers. In addition, to build with local farmers small artisanal sediment traps (output 3) to capture eroded or disturbed soil that is washed off during rainfall, and prevent that the sediment enter the rivers.
Forest areas are not protected.	To strengthen the means to conserve forest and vegetation cover in the watershed. Act on two fronts: 1. To work with local landowners to incentive the conservation of ca., 1000 ha of native vegetation (output 1). It will be necessary to provide incentives such as Socio Bosque; the idea of establishing a water fund needs to be thoroughly assessed. 2. To strengthen the means to conserve the vegetation of the two existing protected forests (Toachi – Pilatón and Zarapullo, about 230,000 ha in total) (output 2).
Limited climate-related information.	To generate and disseminate hydro-meteorological information by potentiating and expanding INAMHI's hydro-meteorological network.

Project / Programme Objectives:

21. The project objective is to strengthen the adaptive capacity of the local population in the Toachi – Pilatón water system. The project focus on key drivers that will worsen the probable impact from climate change. The expected mid-term impacts are improved enabling conditions to sustain forest cover and sustainable small-scale farming in the area. In the long-term, it is expected that this will result in improved adaptive capacity. It is also envisioned that the lessons of the project are useful to other parts of Ecuador and other Andean countries.

22. The project is organised into three components;

    a. Component 1 will focus on the conservation of forests. Three outputs will be generated by (i) expanding protection of existing forests under mechanisms of conservation and sustainable forest management[7] (output 1), (ii) strengthening the management of the

[7] The United Nations describe sustainable forest management as a dynamic and evolving concept that aims to maintain and enhance the economic, social and environmental values of all types of forests, for the benefit of present and future generations (United Nations forest instrument, formally known as Non-Legally Binding Instrument on All Types of Forests, adopted by the United Nations General Assembly on 17 December 2007).

existing protected forests and private reserves (output 2), and (iii) to build artisanal sediment retention dams[8] in key risk areas (output 3).

b. Component 2 will focus on introducing sustainable farming practices to reduce the impact on the local water cycle and to adapt to probable conditions of reduced rainfall. One output will be generated by introducing best practices in about 250 ha of pasture land and 250 ha of crops (including sugarcane) (output 4).

c. Component 3 will focus on strengthening private and public local capacities to implement adaptation measures. Three outputs will be generated by (i) strengthening climate-monitoring (output 5), (ii) introducing adaptation to climate change into parish development and land use plans[9] (output 6), and (iii) implementing public communication and education plans (output 7). It is foreseen that this component will facilitate dialogue and collaboration among stakeholders to strengthen social capital.

23. The basis of the project strategy is to conserve the forest cover by strengthening the conservation of native vegetation (component 1), and reducing the expansion of the agriculture frontier and farming related deforestation (component 2). The introduction of best farming practices will also contribute to reduce soil erosion and degradation. The proposed artisanal sediment traps (output 3 of component 1) will be a complementary measure to reduce the sediment load to the rivers.

    Component 3 will support the other two components:

    a. The public communication and education actions (output 7) will contribute to sensitise and inform local stakeholders. This will in turn, back the work with farmers, landowners and local authorities, and will contribute to build basin-wide management.

    b. Mainstreaming climate change adaptation into the parish development plans (output 6) will contribute to sustain forest conservation and improved farming practices (components 1 and 2). It is expected that these, and other improved measures, will become mandatory in the parishes.

    c. The generation and dissemination of hydro-meteorological information will contribute to awareness raising of stakeholders, as well as to better manage the farm operations.

Project / Programme Components and Financing:

24. The preliminary estimate of funds allocation is presented in the following matrix. During project preparation, the allocation to the various outputs might need to be adjusted.

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

[8] During stakeholder consultation, it was proposed that this element is further analysed during the preparation of the full project proposal.

[9] Parishes have a local government elected by public vote formed by a President and a council. The parish government has a set of competences established by law, those relevant to the present project are: (i) to plan local development and land use in coordination with the municipal and provincial governments, (ii) to promote productive activities, biodiversity conservation and environment protection, and (iii) to promote the organization of rural communities.

Components	Outcomes	Outputs	Amount (USD)
	change on the watershed´s hydrological cycle.	conservation mechanisms.	
		2. Improved management of existing protected forests and private conservation areas (ca., 230,000 ha)	270,000
		3. Five artisanal sediment retention dams.	180,000
2. Adapt farming practices to new climate change conditions	2. At least 500 ha of agriculture land apply sustainable farming practices appropriate to the foreseen impacts of climate change	4. 250 ha of pasture and 250 ha of crops apply sustainable farming practices[10].	900,000
3. Strengthen local capacities and share lessons	3. Local population and parish governments with increased capacity to implement climate change adaptation measures.	5. Improved monitoring stations (3 meteorological and 4 hydrometric) provide prompt and reliable information to the local population and relevant authorities	150,000
		6. Six development plans[11] incorporate measures for climate change adaptation with a watershed perspective.	70,000
		7. Public communication and education plan implemented in the lower basin (ca., 13,000 people)	120,000
Project/Programme Execution cost			180,000
Total Project/Programme Cost			2.370.000
Project/Programme Cycle Management Fee charged by the Implementing Entity (if applicable)			119.373
Amount of Financing Requested			**2.489.373**

[10] The surface to be intervened will be decided with local stakeholders during preparation of the full proposal. The current figures were proposed by local farmers during the inception workshop in July 2016.

[11] Parishes Manuel Cornejo Astorga, Aloag, El Chaupi, Palo Quemado, and Las Pampas, and the rural area of Sigchos. These parishes are located in the lower basin of the Toachi – Pilatón water system.

Projected Calendar

Milestones	Expected Dates
Start of Project/Programme Implementation	August 2017
Mid-term Review (if planned)	September 2019
Project/Programme Closing	August 2021
Terminal Evaluation	May 2021

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.

25. The project strategy focusses on implementing actions that will minimize, as much as possible, the foreseen impacts of climate change in the Toachi – Pilatón water system. The main conceptual frameworks will be a sustainable livelihoods approach (Chambers & Conway, 1991; Scoones, 1998), ecosystem-based adaptation[12] (EbA), and watershed management approach for climate change adaptation.

26. The project is organized into three components and three outcomes. Seven outputs will be produced. The multiyear workplan will be developed during project preparation.

Component 1. Conserve vegetation cover

27. This component will generate one outcome to be built from three outputs. It concentrates 40% of the total project cost.

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

28. The purpose of this outcome is to encourage conservation of the existing forest cover by introducing strengthening the management of the existing protected forests (ca., 230,000 ha) (output 1) and expanding the area under conservation with local stakeholders (output 2). In addition, artisanal sediment retention dams will be built to reduce the flow of material to the rivers (output 3).

[12] Ecosystem-based adaptation uses biodiversity and ecosystem services in an overall adaptation strategy. It includes the sustainable management, conservation and restoration of ecosystems to provide services that help people adapt to the adverse effects of climate change (CBD, 2009).

29. Output 1 will promote the conservation of 1,000 ha of native vegetation that contribute to the regulation of the hydrological cycle, and which are not currently guarded by any protective measure. Incentives will be provided to rural populations that voluntarily commit to the conservation and protection of their native forests and vegetation. The Socio Bosque[13] approach will be used, but including long-term contributions of key stakeholders like HIDROTOAPI and water companies.

30. A water fund might be a useful mechanism to integrate contributions from public and private stakeholders and ensure long-term management. Ecuador has strong experience developing and using water funds. An interesting experience is the Fondo de agua para la conservación de la cuenca del río Paute (FONAPA). This fund is related to Paute hydroelectric power station. The constituents include Cuenca´s water company (ETAPA), HIDROPAUTE (a state-owned hydroelectric company), ELECAUSTRO (the electric company that provides service to Cuenca and surrounding areas) and the national company in charge of providing electricity along the country (CELEC).

31. The feasibility of establishing a water fund in the Toachi – Pilaton watershed will be assessed during the preparation of the full proposal.

32. Output 2 will strengthen the institutional and legal frameworks to manage the Toachi – Pilatón (ca., 212,000 ha) and Zarapullo (ca., 21,000 ha) protected forests, as well as existing private reserves[14]. Currently these areas do not have management strategies and are under pressure to be converted in extensive farming grounds.

33. To protect these areas, the status of the protected forests will be assessed and safeguarding strategies will be designed with local partners interested in supporting the conservation of the standing forests. It is expected that interested parties contribute to the long-term conservation of these areas, probably through a water fund. Possible partners may include parish governments, municipalities, provincial governments, HIDROTOAPI, water companies, and the Ministry of Public Works (MOP). As mentioned before, the feasibility of establishing a water fund will be analysed during project preparation.

34. 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 protected forests and private reserves contribute 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.

35. Output 3 takes into account that EbA 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 Project for Adaptation to Climate Change through an Effective Water Governance in Ecuador (PACC) will be applied in the areas of intervention. With local groups,

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[13] Socio Bosque is an initiative, started in 2008, of the Ministry of the Environment that offers economic incentives to owners of land with native forests to guarantee its protection over the medium to long-term. The programme provides direct payments for each hectare of native vegetation conserved per year; payments are made annually for a period of 20 years once a conservation agreement is signed between the owner and MAE.

[14] On the first screening three private reserves were identified: [1] Reserva de Bosque Integral Otonga (1000 ha), [2] La Hesperia Reserva Natural (814 ha), and [3] Reserva Florística Río Guajalito (1000 ha). During project preparation an in-depth analysis will be done, because it is very likely that more private protected areas exist.

small-scale dams for sediment retention and the reduction of flow rate will be constructed in small ravines. The feasibility, location and scope of these structures will be decided during preparation of the full proposal.

Component 2. Adapt farming practices to new climate change conditions

36. This component will generate one outcome based on one output. This is the largest component of the project, it concentrates about 38% of the total project cost

Outcome 2. At least 500 ha of agriculture land apply sustainable farming practices appropriate to the foreseen impacts of climate change.

37. The purpose of this outcome is to encourage local farmers to use sustainable farming practices that improve their harvest, while (i) reducing pressure on the standing forests, and (ii) preventing land degradation.

38. Output 4 focus on introducing best practices in at least 500 h of farmland, to reduce the impacts of farming and cattle raising on native forests and land degradation. Working with farmers´ organizations, best practices will be introduced to increase production using a smaller area. The main lines of work will be (i) cattle and pasture management, and (ii) sugarcane production. Nonetheless, other crops will also be addressed (e.g., mortiño, naranjilla, yuca, tomato).

39. So far there is interest to participate from three local organizations:

    a. Las Pampas cattle ranchers´ association to introduce improved cattle and pasture management practices in 250 ha.

    b. Flor de Caña Association (sugarcane producers) to introduce improved practices for sugarcane production in 250 ha and to explore forms to improve panela production units to reduce the use of firewood.

    c. The association of producers from Quinticusig who grow and process mortiño (*Vaccinium meridionale* Swartz).

Component 3. Strengthen local capacities and share lessons

40. This component has one outcome and three outputs. Outcome 3 will aim at empowering local stakeholders and institutions to drive basin-wide adaptation to the effects of climate change and watershed management.

41. Output 5 will potentiate and expand INAMHI's hydro-meteorological network to have information of the water system. INAMHI will identify the most suitable sites 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; they will be linked to INAMHI´s national network and the corresponding early warning systems[15]. Also, sediment samplers will be installed in key sites to monitor the sediment load. It is anticipated that this information will support informed decisions about watershed management by local stakeholders and pertinent authorities. The number and location of meteorological stations and sediment samplers will be decided during project preparation.

[15] The Risk Management Secretariat (SGR) administer the early warning systems. There is a decentralised national system for risks management in which includes, at the municipal level, a Risk Management Committee and an Emergency Operations Committee.

42. Output 6 will support mainstreaming climate change adaptation into parish development plans using MAE´s guidelines[16]. It is foreseen to work with five parishes: (1) Manuel Cornejo Astorga, (2) Aloag, (3) El Chaupi, (4) Palo Quemado, and (5) Las Pampas. The combined population of these parishes is about 17,000 people. It is also foreseen to work with the central urban parish of Sigchos, which in fact has mostly rural population[17]. These parishes are located in the lower basin of the Toachi – Pilatón water system.

43. There will be emphasis in articulating collaboration and dialogue among local authorities in support of integrated watershed management and EbA. Actions will include training on climate change adaptation. All this will promote engagement and empowerment of local governments.

44. Output 7 will be the backbone of the project´s learning process. A Public communication and education plan, grounded on the parish governments, will promote (i) understanding of probable climate change impacts, (ii) knowledge about appropriate adaptation measures, (iii) sound water management with a watershed perspective, (iv) biodiversity conservation, and (v) multi-level dialogue and collaboration among stakeholders. The purpose will be to foster improved long-term collaborative action and management of the basin which includes implementation of effective measures to confront climate change.

45. The project will systematically document experiences and lessons and disseminate them to stakeholders and interest groups. The mid-term Review and Terminal Evaluation will be a key part of the project´s learning process. It is foreseen that the project´ lessons and best practice will be useful to other part of the country.

46. Annex 9 summarise the alternative approaches that were analysed but not adopted.

B. Describe how the project / programme would provide 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 would avoid or mitigate negative impacts, in compliance with the Environmental and Social Policy of the Adaptation Fund.

Beneficiaries

47. 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:

    a. Parish governments of Las Pampas, Palo Quemado, El Chaupi, Aloag and Manuel Cornejo Astorga that will mainstream the climate change variable and adaptation measures in their planning and land use zoning. It is also expected to mainstream adaptation into the plans for the rural area of Sigchos[18]. These parishes will also have improved forest conservation, better agriculture production, access to hydro-

[16] MAE issued guidelines for climate change plans, programmes and strategies of decentralized autonomous governments by Ministerial Agreement 137 of 19 May 2014. A manual was published by MAE (2014).

[17] The central urban parish of Sigchos has a population of 7,933 people, but only 25% of them live in the urban area. The other are scattered rural population.

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

meteorological information, and enabling conditions for multi-level dialogue and collaboration. The population in these areas is about 14,000 people (Table 1).

b. At least 25 technical staff from the parish governments and municipalities (i.e., Sigchos and Mejía) will benefit from training on adaptation to climate change.

c. At least 200 stakeholders will benefit from the exchange of experiences.

d. At least 60 farmer families will benefit sustainable farming practices.

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

a. Water users from the Toachi – Pilatón drainage basin.

b. About 22,000 people who live in the lower part of the drainage basin.

c. HIDROTOAPI hydroelectric plant and the users of the electricity it will generate.

Economic benefits

49. Farmers that apply sustainable farming practices will benefit from an increased yield and income. It is expected that these farmers will catalyse the use of improved practices by a larger number of producers.

50. Better hydro-meteorological information will support the early warning systems. This will contribute to reduce damages and losses caused by landslides and flooding on the Aloag – Santo Domingo road and the local villages.

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

Environmental Benefits

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

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

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

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

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

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

Social Benefits

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

58. Farming families will benefit from improved practices. The project will pay particular attention to the role of women and other family members (e.g., children and older adults) in local farms to adapt, as much as possible, the new sustainable farming practices to the dynamics of the farming families.

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

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

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

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

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

63. The AF investment will directly benefit about 14,000 people, and indirectly will benefit the entire population of the lower part of the Toachi – Pilatón water system (ca., 22,000 people). The project will contribute to strengthen the adaptive capacity of local stakeholders reducing the level of future impacts generated by climate change.

64. The project will ensure the cost-effectiveness of resources by allocating AF funds to activities and products with high catalytic potential, such as:

Activity	Target	Investment	Cost per unit target
Improve management of protected forest.	230,000 ha	USD270,000	USD1.17/ha
Increase conservation area	1,000 ha	USD500,000	USD500/ha

Introduce sustainable farming practices.	500 ha ≥60 families (ca., 300 people)	USD900,000	USD1,800/ha USD15,000/family
Mainstream adaptation into local plans	6 parishes ca., 14,000 people	USD70,000	USD11,666/parish USD5/person
Implement a public communication plan focused on specific interests and channels of key stakeholders.	6 parishes ca., 14,000 people	USD120,000	USD20,000/parish USD8.6/person

65. Alternative approaches were analysed to address the key barriers listed in paragraph 19 (Annex 9), the following decisions were made:

    a. To concentrate only on formal education actions was considered, to focus mainly on children and young adults. This kind of communication and education actions were less costly (ca., USD 80,000), but they will not directly access all local groups. The advantage of formal education actions is to build a basis for future change, but the pressing issues need to involve all stakeholders and local groups.

    b. At first, it was considered to concentrate on municipal development plans. In terms of cost, the investment will be about the same as planned. However, it was decided to focus on parish plans, because of political considerations. First, parish governments are closer to the local population. Second, municipal plans involve more complex dynamics, including urban issues. Therefore, conserving vegetation cover and soil to confront climate change may not have a high priority in the political agenda of municipal plans.

    c. To address deforestation and soil degradation, three alternatives were considered: (i) change of crops, (ii) agroforestry and (iii) introduce better practices into existing cultivars.

    The first option was discarded because it will require an enormous amount of investment and effort to yield results. To implement an agricultural extension service and to motivate and implement crop replacement will be far beyond the scope of time and cost of the present project. Such an effort in the Toachi – Pilaton watershed would require a sustained effort of at least 15 years, with an annual investment of at least USD1.0 million.

    The second option was discarded because it will not produce short-term benefits to the local farmers. In terms of cost, it would probably require the same amount of investment, but may not rapidly improve yield and profitability, and there were doubts about the probable adoption rates.

    The third option was selected because it focuses on the existing interests of local farmers. It also takes advantage of the interest of panela producers to seek opportunities in the expanding market for sustainable and organic panela.

    d. To conserve the vegetation cover will require positive incentives to landowners and long-term action in a number of fronts like guarding the areas, and enrichment planting of native vegetation. The use of the Socio Bosque programme was the first option. The proposed project investment (i.e., USD 500,000, output 1) could cover agreements for 1,250 ha[19].

[19] Socio Bosque pays ca., USD20.00 per hectare per year. The standard 20-years agreement will require USD400/ha.

However, it has been considered that a combination of Socio Bosque type incentives and a water fund might be more beneficial. This combination could ensure a financial flow to sustain not only the incentives to landowners, but also additional actions like measures for soil conservation and guarding the state-owned protected forests. The feasibility of using a water fund will be analysed during the following phase of project preparation.

66. A detailed cost-effective analysis will be formulated during project preparation.

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.

67. 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. Article 414 establishes that "the state will adopt appropriate and transverse measures to mitigate climate change, by limiting emissions of greenhouse gases, deforestation and atmospheric pollution; also will take measures for the conservation of forests and vegetation and will protect the population at risk." In addition, the Constitution recognizes the need to "oversee land use planning of watersheds and encourage the creation of watershed councils, in accordance with the law."

68. The national development plan (SENPLADES, 2013) states in its general objective 7 that climate change is a multisector problem of national scope that should be approached with programmatic actions which generate results in the short and medium term. Specific objective 7.10 focus on implementing measures to mitigate and adapt to climate change to reduce the economic and environmental vulnerability with emphasis on priority groups. In addition, specific objective 7.6 focus on managing water resources in a sustainable and participatory manner, with a focus on watersheds and ecological flows to ensure the human right to water.

69. The project is in line with the National Climate Change Strategy (MAE, 2012), in particular with specific objectives 2 and 4. The first, focus on 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. The second, focus on managing 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 addition, the National Plan for Climate Change 2015-2018 established the water sector as a national priority and required the analysis of the vulnerability of flagship hydropower plants to the effects of climate change. The results of the analysis for the Toachi -Pilatón hydropower plant have been used to prepare the present project.

70. The project will contribute to implement Ecuador´s national plan for integrated and integral management of water resources of watersheds and micro-watershed, and is in line with the national regulations on water resources management.

71. Finally, the project will contribute to strengthen the development and land use plans of parish governments.

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.

72. MAE is the national environment authority and administer (i) the environmental impact evaluation system, (ii) forest use, (iii) protected forests, and (iv) the national system of protected areas. The project intervention will comply with the environmental regulatory framework established by the Environmental Management Law (Law 37 of 1999, coded in 2004), the environmental impact evaluation system (Executive Decree 061 of 2015), the Forestry and Conservation of Natural Areas and Wildlife law (Law 2004-017 coded in 2004) and complementary regulations.

73. The project will seek to take advantage of the recently adopted Organic Law on rural land and ancestral territories (signed on March 2016). This law establishes that rural lands must serve social and environmental functions (articles 11 and 12). The social function refers to be productive, and the environmental function refers to apply sustainable practices and conserve key habitats. It is relevant to the present project that the law:

    a. The law recognises that private or communal rural land fulfils the environmental function when is dedicated to conservation of renewable natural resources, including forest protection and production, conservation incentives (e.g., Socio Bosque), ecotourism and recreation. There will be incentives to those who fulfil the social and environmental functions.

    b. The law states that rural state land cannot be claimed by possessors or invaders (article 18); this opens a line of action to solve certain land-tenure issues.

    c. The law forbids the expansion of the agriculture frontier into fragile and threatened ecosystems (article 50), including cloud forests. However existing subsistence agriculture activities will be respected.

74. The project infrastructure will be minimal (i.e., artisanal sediment retention dams) and may not require an environmental impact assessment. Nonetheless, the design and construction will comply with pertinent building regulations.

75. The meteorological stations will comply with INAMHI´s required specifications and will be integrated into the national monitoring system.

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

76. No duplication with other funding sources was found. However, the project will have synergies with a number of initiatives.

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

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

    a. Enhancing Resilience of Communities to the Adverse Effects of Climate Change on Food Security (FORECCSA). This project is funded by the Adaptation Fund (AF), the implementing agency is the World Food Programme, and the project partners are MAE, the Ministry of Agriculture, Livestock, Aquaculture and Fisheries (MAGAP), the Jubones River Basin Public Consortium, and the Provincial Government of Pichincha. The present project will use the experience and lessons on mainstreaming gender in rural communities for food security and adaptation to climate change.

b. Adaptation to Climate Change through Effective Water Governance (PACC). This is a GEF sponsored project (GEF ID 2931) under implementation. The executing agency is MAE, and the GEF implementing agency is UNDP. It does not cover the present area of intervention, but its lessons will be useful to the present project. The present project will use the experience and lesson on mainstreaming water climate risk in local planning and application of water saving measures by farmers.

c. Analysis of the vulnerability of flagship hydropower plants to the effects of climate change (CHECC), in particular la results for the Toachi – Pilatón hydropower plant. The present project is using the results of the watershed vulnerability analyses.

d. Third National communication (3NC) and First Biennial Update Report (BUR). This is a GEF funded project (GEF ID 5478) under implementation in Ecuador. The executing agency is MAE, and the GEF implementing agency is UNDP. The project objective is to prepare the third national communication on climate change and the first biennial update report. The present project will use the results of 3NC, in particular the outcomes of the climate change models and the guidelines for climate change adaptation.

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

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

80. Component 3 of the project focus on learning and knowledge management. It comprises one outcome (i.e., outcome 3) and three outputs (i.e., outputs 5, 6 and 7).
81. The backbone is the public communication and education plan that will (i) raise public awareness and engagement, (ii) facilitate communication and collaboration among stakeholders and project partners, and (iii) enable dissemination of information and lessons.
82. The project will disseminate information and results through MAE´s website and the social networks it uses (e.g., Facebook, Twitter). MAE´s policy is to maintain a webpage for each project within its main portal. MAE´s communications office will ensure that information will be channelled to local and national media to reach a wider audience.
83. The project team will systematically document and record the advances. A monthly electronic information bulletin will be prepared and disseminate to inform the stakeholders and interest groups. It is envisioned to produce promotional material and documents to be used by local communities and stakeholders.

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

84. During preparation of the present project concept, there was consultation with local groups and relevant government organizations.
85. Local stakeholders were approached during 2015 to discuss the project idea (Annex 4).

86. During June 2016, the intervention area was visited to identify key stakeholders and gather initial information about their perspectives and needs. This information served to prepare the inception workshop.

87. On 15 July 2016, an inception workshop was held in Unión del Toachi (Annex 5). Participatory rural appraisal techniques were used to gather local perceptions, views and opinions.

88. Thirty-nine people participated (14 were female, 35.8%), including the main farmer´s organizations, all the parish governments, the two main municipalities (Sigchos and Mejia), local NGOs, and key government entities (e.g., MAGAP, SENAGUA, INAMHI, MAE). Transportation was provided to facilitate attendance of remote participants. Some areas are quite retired, with limited access to public transportation. Participants from Sigchos (the most distant site) had to travel for about three hours to attend the meeting. The memoir of the workshops (including list of participants) is in Annex 5.

89. The workshop had the following main elements:

    a. The existing knowledge about future weather conditions in the area, and the probable impacts of climate change were presented. The results of MAE´s analyses (paragraphs 10 to 13) were handed in printed maps. Participants were motivated to clarify doubts and present their views and experience.

    b. The initial ideas of a project concept (i.e., draft results framework and budget allocation) were presented. Participants were motivated to comment and provide initial recommendations.

    c. Two groups were formed, corresponding to the major subbasins (Pilatón and Toachi). Each group prepared a participatory situation analysis, identifying the key issues, probable causes and groups involved. In plenary, priority issues were selected for each subbasin.

    d. The same groups identified priority actions and probable sites and local partners. In plenary, proposals were reviewed and adjusted. Also, farmer organizations and parish governments confirmed their interest to contribute to project design and execution. There were recommendations of other key groups that need to be approached.

    e. To close the workshops, participants outlined a set of agreements for adjustments of the project concept, and pending elements to be addressed in the following months (e.g., prepare maps using more recent information on land use and forest cover, analyse land tenure and conflicts in protected forests).

90. As a result of the consultation process the project concept was adjusted and specific targets were set.

91. After the inception workshop, a stakeholder analysis was prepared (Annex 8). Semi-structured interviews were applied to groups in all locations of the watershed.

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

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

93. The present project will allow to mainstream adaptation into local communities and implement actions to address specific threats and barriers. The AF contribution will allow to implement

three key adaptation measures within a watershed perspective: (i) to conserve vegetation cover, (ii) to reduce pressure from farming activities, and (iii) to engage the local population into climate change adaptation.

Component 1. Conserve vegetation cover

Baseline

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

95. Some landowners have established private reserves to conserve biodiversity. There are at least three private reserves covering about 2,800 ha. There are limited incentives to maintain forest areas in natural condition. The Socio Bosque programme was an interesting option, but after a promising start ran into financial problems. Private landowners of forest areas also face pressure from illegal farmers.

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

With Adaptation Fund investment

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

98. The project will allow to:

    a. Develop and implement a system of incentives to finance the conservation of the existing protected forests and to provide incentives to landowners that voluntarily commit to the conservation and protection of their native forests and vegetation. This may be a water fund, that consolidate contributions from water users (e.g., HIDROTOAPI, water companies, rural water boards) and invest in forest conservation (e.g., incentives to landowners, protection, reforestation).

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

Component 2. Adapt farming practices to new climate change conditions

Baseline

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

With Adaptation Fund investment

100. AF support will allow to introduce sustainable farming practices to increase production per unit area, therefore reducing the need to clear forest to expand farming areas.

101. Improved farming practices will be introduced in at least 250 ha of cattle production and 250 ha of sugarcane fields. The project will work with farmers´ organizations in Las Pampas and Palo Quemado parishes.

102. Panela production will be analysed and improvements to the furnaces will be introduced to improve efficiency and reduce the consumption of fire wood.

Component 3. Strengthen local capacities and share lessons

Baseline

103. The local population and stakeholders are not fully aware of the climate-related risks, and are not engaged into advance adaptation to climate change. Parish plans mention climate change, but do not incorporate actions to implement adaptation measures.

104. INAMHI has eight meteorological stations in the area, but only two are functioning. Therefore, weather monitoring is very limited and the local population do not have access to sound information for decision making. In addition, INAMHI has serious financial limitations to sustain the operation of a network of meteorological stations in the area.

With Adaptation Fund investment

105. With AF support a public communication and education plan, grounded on the parish governments. It will cover about 14,000 people of the six parishes that are part of the Toachi – Pilaton water system. In addition, the project will directly support parish governments to mainstream climate change into the local development plans. All this will allow to engage local stakeholders into climate change adaptation action, and will be a valuable catalyst to increase local resiliency and build social capital.

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

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

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

108. Social sustainability will be based on the participatory approach and the integration of key stakeholders. The project will promote multi-level dialogue, networking and collaboration to build social capital in support of watershed conservation.

109. The project is anchored in pertinent local and national authorities responsible for local development and climate change adaptation. Parish governments are the centrepiece of the project, but it will also involve municipal and provincial governments, pertinent sectoral authorities (e.g., MAGAP, SENAGUA) and community organizations (e.g., Flor de Caña). It is foreseen that through this networking the core elements of the project will continue in the institutional agendas.

110. A water fund is being considered as a financial and technical mechanism to sustain critical elements like forest conservation, technical support to local farmers and weather monitoring. It is expected that HIDROTOAPI and other water users will be motivated to contribute to the water fund to maintain long-term key actions. The viability of this instrument will be assessed during project preparation.

111. Finally, it is foreseen that parish governments and other project partners will integrate actions into their institutional budgets to ensure post-project sustainability.

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

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

113. The present project concept was screened and assessed as required by the ESP. The results of the screening process are presented in Annex 7 and summarised in Table 4 and Table 5. The methodology applied to ensure compliance of the present project with the ESP is described in the following sections. The key background documents use are AF (2013), AF (2016) and AF (2016a).

114. As a result of this analysis, potential minor environmental and social impacts and risks associated to the implementation of some activities were identified. The five environmental and social principles that will require attention during project implementation are:

    Principle 1. Compliance with the Law

    Principle 2. Access and equity

    Principle 5. Gender equity and women´s empowerment

    Principle 9. Protection of natural habitats

    Principle 12. Pollution prevention and resource efficiency

115. The principle on gender equity and women´s empowerment has to be considered in five of the seven project outputs. During project preparation, it will be necessary to assess that actions on forest conservation and improved farming practices, do not overload the workload of women and other family members. It has been seen that local men are opting for paid jobs in Santo Domingo (capital of the de Santo Domingo de los Tsáchilas province). Therefore, tending for the farm and animals is being delegated to other family member. In addition, it will be necessary to ensure that the adaptation actions to be mainstreamed into the local development plans and the communication and education actions are gender and age sensitive and do consider the needs of persons with disabilities.

116. The construction of five artisanal sediment retention dams (output 3), is the only action that will need a further environmental impact assessment approved by the corresponding environmental authority during the project's implementation. During project preparation, the

feasibility of building the artisanal dams will be assessed[20], and their social and environmental impacts will be analysed.

117. In addition, screening was done using CAF´s preliminary environmental and social risk analysis matrix (instrument FR-086) (Annex 6), which is part of CAF´s environmental and social management system. As stated in ESP´s article 8 “"implementing entities that use a different but functionally equivalent system of categorization can continue to use that system and still meet the requirements of the policy".

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

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

Principle 1: Compliance with the Law.

120. The only element of the project that will require a specific permit is the construction of the five artisanal sediment retention dams. The responsible for construction and operation of the dams (still to be defined) will require an Environmental Registry which is issued online after filling a formulary and paying a fee. According to the Ecuadorian environmental regulation, this type of intervention is categorised as having low environmental and social impact.

Principle 2. Access and Equity.

121. An initial stakeholder analysis was prepared (Annex 8). Key stakeholders were identified, as well as existing or potential conflicts that might affect project execution. The analyses found no evidence of opposition to the project proposal, or conflicts that could affect project execution.

122. In general, the project actions will not impede access to basic services and land rights. However, it is noted that measures need to be taken to ensure that local groups are adequately informed of the project intervention, mainly the actions to conserve the forest cover and the mainstreaming of adaptation measures into the local development plans.

Principle 3. Marginalized and Vulnerable Groups.

123. No vulnerable or marginalized will be affected by the project scope

Principle 4. Human Rights.

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

[20] There is no consensus on the use of these artisanal dams. During the inception workshop and in-depth interviews with stakeholders, it was clear that a number stakeholders disagree with the use of the artisanal dams. A final decision on their use will be done during project preparation.

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

Principle 5. Gender Equality and Women's Empowerment.

126. Ecuador ranks high in the Global Gender Gap Index. Ecuador has almost complete equality in educational attainment and health and survival, and a high level in economic participation and opportunities, but a major gap in political empowerment (WEF, 2015).

127. The stakeholder analysis (Annex 8) found that there is strong women leadership in local organizations and parish governments. Also, women have an important role in businesses like commerce and restaurants. The condition of women in the Toachi – Pilaton watershed is similar to other Ecuadorian rural areas.

128. The analyses did not find factors that will impede or limit women´s participation in project activities. However, it has to be considered that men are increasingly seeking payed jobs in Santo Domingo, the nearest large city. This in turn, increase the workload for women to tend for the farm and the animals. Therefore, the project will have to be cautious to implement actions in support of gender equality and women´s empowerment, and to prevent overloading women activities (outputs 1, 2 and 4). Also, it will be needed to ensure that the adaptation actions to be mainstreamed into the local development plans (output 6) and the communication and education actions (output 7) are gender and age sensitive and do consider the needs of persons with disabilities.

Principle 6. Core Labour Rights.

129. Ecuador has ratified the eight core labour conventions. The project intervention has no implication with the four fundamental principles and rights at work.

Principle 7. Indigenous Peoples.

130. ILO convention 169[21] is in force in Ecuador. There is no indigenous population in the project area.

Principle 8. Involuntary Resettlement.

131. The project intervention does not imply displacement of local population.

Principle 9. Protection of Natural Habitats.

132. The project will not intervene in protected areas or high value conservation areas. However, it will be important to ensure that the role of natural habitats is integrated into the adaptation measures to be mainstreamed into the local development plans (output 6).

Principle 10. Conservation of Biological Diversity.

133. Ecuador has signed and ratified the Convention on Biological Diversity and have a recently updated National Biodiversity Strategy. The project will not intervene areas with high value biodiversity or introduce invasive species. On the contrary, project actions will contribute to conserve forests and vegetation cover.

[21] i.e., Convention concerning Indigenous and Tribal Peoples in Independent Countries.

Principle 11. Climate Change.

134. The project does not include activities that involve a significant increase in emissions of greenhouse gases or other climate change stressors.

Principle 12. Pollution Prevention and Resource Efficiency.

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

Principle 13. Public Health.

136. The project does not imply negative impacts on public health.

Principle 14. Physical and Cultural Heritage.

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

Principle 15. Lands and Soil Conservation.

138. The project will not intervene valuable land. On the contrary, the project action will contribute to soil conservation.

139. During project preparation, a detailed stakeholder and gender analysis will be prepared and details on the role of women in the farms and local organizations will be obtained. This will serve to adjust project actions to be gender, age and cultural sensitive.

140. Also, during project preparation, the project´s Environmental and Social Management Plan will be prepared.

141. The hydroelectric power plant is not part of the present project, but it is worth mentioning that it has an Environmental Impact Assessment, an Environmental License, and an Environment and Social Management Plan. Its construction did not involve displacement of indigenous or vulnerable groups. The plant is under construction; it is expected to begin operation during 2017.

Table 4. Screening matrix to verify compliance with the Adaptation Fund´s Environmental and Social Policy.

Checklist of environmental and social principles	**No further assessment required for compliance**	**Potential impacts and risks – further assessment and management required for compliance**
Compliance with the Law	No risk or adverse impacts. The project is in compliance with domestic and international law	The artisanal sediment retention dams will have to obtain the corresponding

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
		environmental permit[22].
Access and Equity	No risk or adverse impacts. The project intervention will contribute to protect the inhabitants of three coastal cities from climate-related risk. The project will not impede / limit access to essential services and rights. Communication and public awareness activities will be open to everyone.	Ensure that local population and stakeholders are adequately informed and engaged in project actions.
Marginalized and Vulnerable Groups	No risk or adverse impacts to marginalized and vulnerable groups.	
Human Rights	No risk or adverse impacts. Both countries are parties of the core human rights treaties. The project intervention does not imply any sort of violation of human rights.	
Gender Equity and Women's Empowerment	No risk or direct adverse impacts. The project interventions will not impede or limit women´s participation	Ensure that forest conservation and farming actions (outputs 1, 2 and 4) does not negatively increase workload to women and other family members (e.g., children, senior people). Ensure that local development plans and public communication and education actions (outputs 6 and 7) are gender, age and cultural sensitive, and consider special needs of persons with disabilities.
Core Labour Rights	No risk or adverse impacts. The project intervention has no implication with the four	

[22] The responsible for construction and operation of the artisanal sediment retention dams (to be decided during project preparation) will submit information to MAE to obtain and environmental registry.

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
	fundamental principles and rights at work[23].	
Indigenous Peoples	No risk or adverse impacts. The project intervention will not affect indigenous groups or territories.	
Involuntary Resettlement	No risk or adverse impacts. The project intervention does not imply involuntary resettlement.	
Protection of Natural Habitats	No risk or adverse impacts. The project will not intervene in protected areas or high value conservation areas.	Ensure that the role of natural habitats is considered while mainstreaming adaptation measures in local development plans (output 6).
Conservation of Biological Diversity	No risk or adverse impacts. The project does not involve unjustified reduction or loss of biological diversity or the introduction of known invasive species. On the contrary, project actions will motivate the conservation of existing vegetation cover and the associated biodiversity and ecological services	
Climate Change	No risk or adverse impacts. The project will not increase greenhouse gas emissions or the main drivers of climate change indicated in principle 11.	
Pollution Prevention and Resource Efficiency	No risk or adverse impacts. The project does not imply major use of energy or the production of wastes and pollutants. Emissions and residues during construction works will be managed.	Ensure that residues and waste from the construction of the artisanal sediment retention are properly managed.

[23] i.e., child labour, discrimination at work, forced or compulsory labour, and freedom of association.

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
Public Health	No risk or adverse impacts. The project does not imply negative impacts on public health.	
Physical and Cultural Heritage	No risk or adverse impacts. The project will not intervene in cultural / archaeological sites or sites with unique natural values.	
Lands and Soil Conservation	No risk or adverse impacts. The project does not imply soil conversion or degradation. On the contrary, it will contribute to soil conservation.	

Table 5. Summary of the screening of the 15 environmental and social principles by project outcome.

Environmental and social principles	Output						
	1	2	3	4	5	6	7
Compliance with the Law			x				
Access and Equity	x					x	x
Marginalized and Vulnerable Groups							
Human Rights							
Gender Equity and Women's Empowerment	x	x		x		x	x
Core Labour Rights							
Indigenous Peoples							
Involuntary Resettlement							
Protection of Natural Habitats						x	
Conservation of Biological Diversity							
Climate Change							
Pollution Prevention and Resource Efficiency			x				
Public Health							

Environmental and social principles	**Output**						
	1	**2**	**3**	**4**	**5**	**6**	**7**
Physical and Cultural Heritage							
Lands and Soil Conservation							

PART III: IMPLEMENTATION ARRANGEMENTS

A. Describe the arrangements for project / programme implementation.

142. CAF will be the implementing agency and MAE will be the responsible entity. The project will be implemented following CAF's administrative and financial regulations as agreed with the Adaptation Fund.

143. The project partners are the parish governments of Manuel Cornejo Astorga, Aloag, El Chaupi, Palo Quemado, and Las Pampas, the municipal governments of Mejía and Sigchos, MAGAP, INAMHI, SENAGUA and CELEC. Complementary collaboration agreements will be signed with the provincial governments of Cotopaxi and Pichincha, HIDROTOAPI and relevant local organizations.

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

144. The following key risks have been identified:

Project risks					
Description	**Type[24]**	**Impact & Probability level[25]**	**Mitigation Measures**	**Responsible**	**Status[26]**
Change of central government in Ecuador. The new president and will take office in 2017[27]	Political	P = 5 I = 3	Present the project to new authorities in MAE	CAF	No change
Change of municipal government in Ecuador. The new authorities will take office in 2019[28].	Political	P = 5 I = 3	Present the project to new authorities	MAE and CAF	No change
Effect of La Niña in precipitation and local weather conditions[29].	Environmental	P = 3 I = 3	Monitor information and alerts in national meteorological entities, NOAA, and World Meteorological Organization	CAF	Increasing

[24] Environmental, Financial, Operational, Organizational, Political, Regulatory, Strategic, Other

[25] 1 = low / 5 = high.

[26] Over, reducing, increasing, no change.

[27] During the first year of project implementation.

[28] In the mid-term of Project execution.

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

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

145. This section will be developed during preparation of the full proposal.

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

146. Project-level monitoring and evaluation will be undertaken in compliance with standard CAF requirements as agreed with the Adaptation Fund. It is expected to prepare annual Adaptation Fund Project Performance Reports that include the Adaptation Fund Results Tracker.

147. There will be an independent mid-term review and a terminal evaluation to assess progress and lessons.

148. The budgeted monitoring and evaluation plan will be drafted during preparation of the full proposal.

E. Include a results framework for the project / programme proposal, including milestones, targets and indicators.

149. This section will be developed during preparation of the full proposal.

F. Demonstrate how the project / programme aligns with the Results Framework of the Adaptation Fund

Project Objective(s)[30]	Project Objective Indicator	Fund Outcome	Fund Outcome Indicator	Grant Amount[31] (USD)
To strengthen the adaptive capacity of the local population in the Toachi – Pilatón water system	Number of people (men and women) with improved adaptive capacity [target 14,000 people]	Outcome 2: Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses	2. Capacity of staff to respond to, and mitigate impacts of, climate-related events from targeted institutions increased	70,000
		Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	3.1. Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses	120,000
		Outcome 5: Increased ecosystem resilience in response to climate change and variability-induced stress	5.1. Number of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type and scale)	770,000

[30] The AF utilized OECD/DAC terminology for its results framework. Project proponents may use different terminology but the overall principle should still apply

[31] The allocations listed below do not sum the total project Budget. Component 3 (i.e., outputs 7.1 and 7.2) deal with knowledge management and dissemination of lessons and best practice. The AF´s results framework does not have a specific outcome or output dealing with knowledge management.

		Outcome 6: Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas	6.1 Percentage of households and communities having more secure access to livelihood assets	900,000
Project Outcome(s)	**Project Outcome Indicator(s)**	**Fund Output**	**Fund Output Indicator**	**Grant Amount (USD)**
Outcome 1. At least 230,000 ha of native vegetation is conserved to reduce the impact of climate change on the watershed´s hydrological cycle.	Surface (ha) under improved management. [target 230,000 ha]	Output 5: Vulnerable ecosystem services and natural resource assets strengthened in response to climate change impacts, including variability	5.1. Number of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type and scale)	770,000
Outcome 2. At least 500 ha of agriculture land apply sustainable farming practices appropriate to the foreseen impacts of climate change	Production area (ha) under improved management [target 500 ha] Number of people (men and women) who implement sustainable farming practices [target >300]	Output 6: Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	6.1.1. Number and type of adaptation assets (tangible and intangible) created or strengthened in support of individual or community livelihood strategies	900,000
Outcome 3. Local population and parish governments with increased capacity to implement climate change adaptation measures.	Number of strengthened local development plans [target 6] Number of staff (men and women) of local governments and pertinent entities trained on adaptation to climate change [target >25] Number of people (men and women) who have participated in awareness activities and events. [to be defines] Number of visitors to the project´s website [to be defined]	Output 2: Strengthened capacity of national and subnational centres and networks to respond rapidly to extreme weather events	2.1.1. Number of staff trained to respond to, and mitigate impacts of, climate-related events (by gender) 2.1.2 Number of targeted institutions with increased capacity to minimize exposure to climate variability risks (by type, sector and scale)	220,000
		Output 3: Targeted population groups participating in adaptation and risk reduction awareness activities	3.1 Number of news outlets in the local press and media that have covered the topic	120,000

G. Include a detailed budget with budget notes, broken down by country as applicable, a budget on the Implementing Entity management fee use, and an explanation and a breakdown of the execution costs.

150. This section will be developed during preparation of the full proposal.

H. Include a disbursement schedule with time-bound milestones.

151. This section will be developed during preparation of the full proposal.

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List of Annexes

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

A. Record of endorsement on behalf of the government[32]

Provide the name and position of the government official and indicate date of endorsement for each country participating in the proposed project / programme. Add more lines as necessary. The endorsement letters should be attached as an annex to the project/programme proposal. Please attach the endorsement letters with this template; add as many participating governments if a regional project/programme:

(Enter Name, Position, Ministry)	Date*: (Month, day, year)*
(Enter Name, Position, Ministry)	Date*: (Month, day, year)*
(Enter Name, Position, Ministry)	Date*: (Month, day, year)*

6. 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.

B. Implementing Entity certification

Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address

<table>
<tr><td colspan="2">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 (……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.</td></tr>
<tr><td colspan="2">

Name & Signature
Implementing Entity Coordinator</td></tr>
<tr><td>Date: *(Month, Day, Year)*</td><td>Tel. and email:</td></tr>
<tr><td colspan="2">Project Contact Person:</td></tr>
<tr><td colspan="2">Tel. And Email:</td></tr>
</table>

ADAPTATION FUND

Letter of Endorsement by Government

Government of Ecuador
Ministry of Environment

Quito, 09th February, 2017

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

Subject: Endorsement for the National Project Proposal *"Increasing adaptive capacity of local communities, ecosystems and hydroelectric systems in the Toachi – Pilatón watershed with a focus on Ecosystem and Community Based Adaptation and Integrated Adaptive Watershed Management"*

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

Accordingly, I am pleased to endorse the above national project proposal with support from the Adaptation Fund. If approved, the project will be implemented by CAF- Latin American development bank and executed by the Ministry of Environment of Ecuador

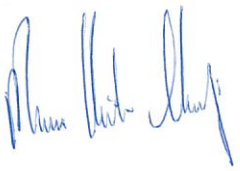
Sincerely,

MARIA VICTORIA CHIRIBOGA
National Designated Authority
Climate Change Undersecretary
Ministry of Environment - Ecuador

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

A. Record of endorsement on behalf of the government[1]

Provide the name and position of the government official and indicate date of endorsement for each country participating in the proposed project. Add more lines as necessary. The endorsement letters should be attached as an annex to the project proposal. Please attach the endorsement letters with this template; add as many participating governments if a regional project:

National Project Proposal: ***Increasing adaptive capacity of local communities, ecosystems and hydroelectric systems in the Toachi – Pilatón watershed with a focus on Ecosystem and Community Based Adaptation and Integrated Adaptive Watershed Management***	
MARIA VICTORIA CHIRIBOGA *National Designated Authority* *Climate Change Undersecretary* *Ministry of Environment – Ecuador*	Date: *February 09, 2017* 

[6] 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.

Annex 1. Abbreviations

AF	Adaptation Fund
CBD	Convention on Biological Diversity
CELEC	Electric Corporation of Ecuador
EbA	Ecosystem based adaptation
GEF	Global Environment Facility
INAMHI	National Meteorological and Hydrological Institute
MAE	Ministry of Environment
MAGAP	Ministry of Agriculture, Livestock, Aquaculture and Fisheries
masl	Metres above sea level
SENAGUA	National Water Secretariat
SGR	Risk Management Secretariat

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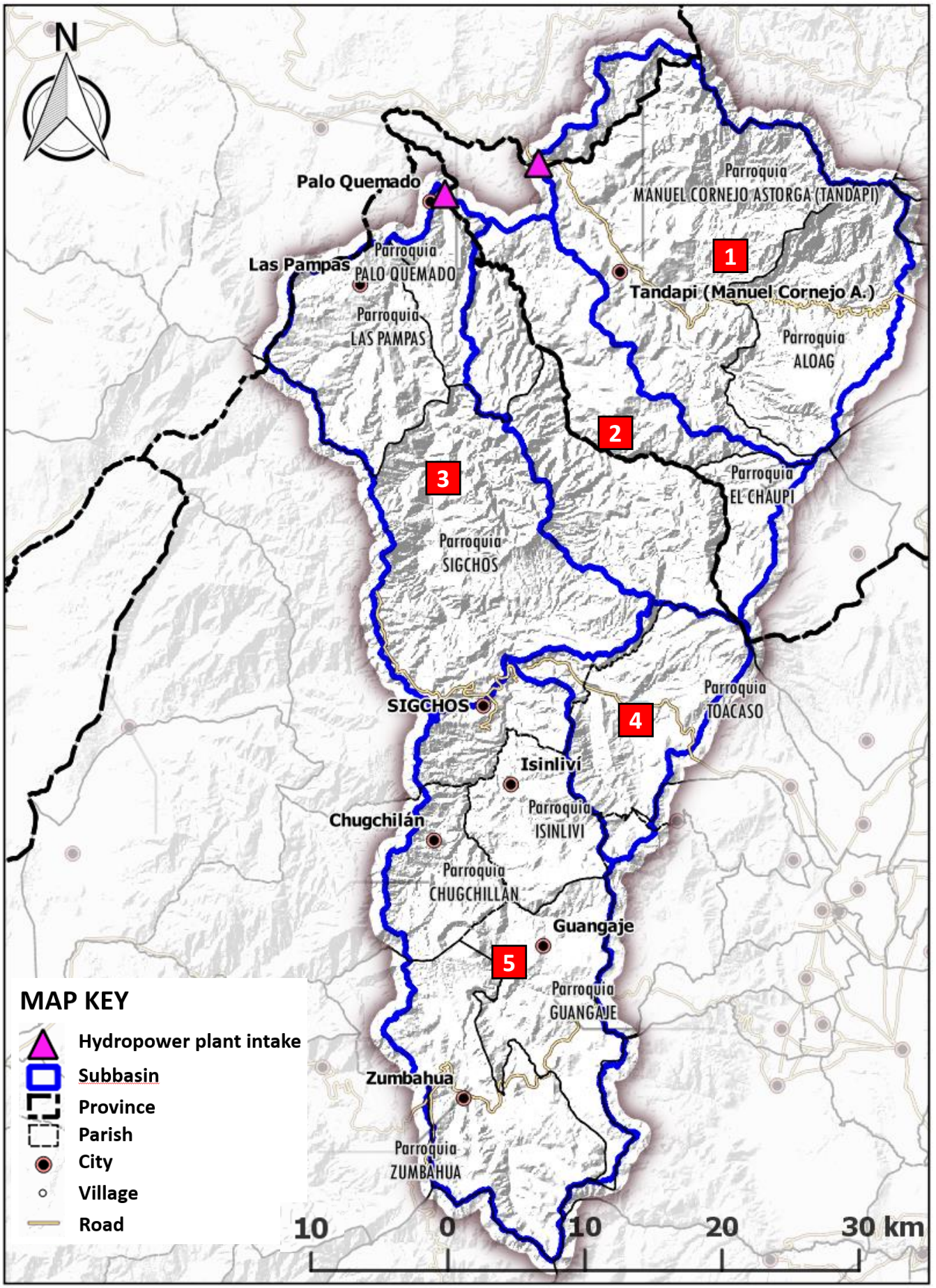
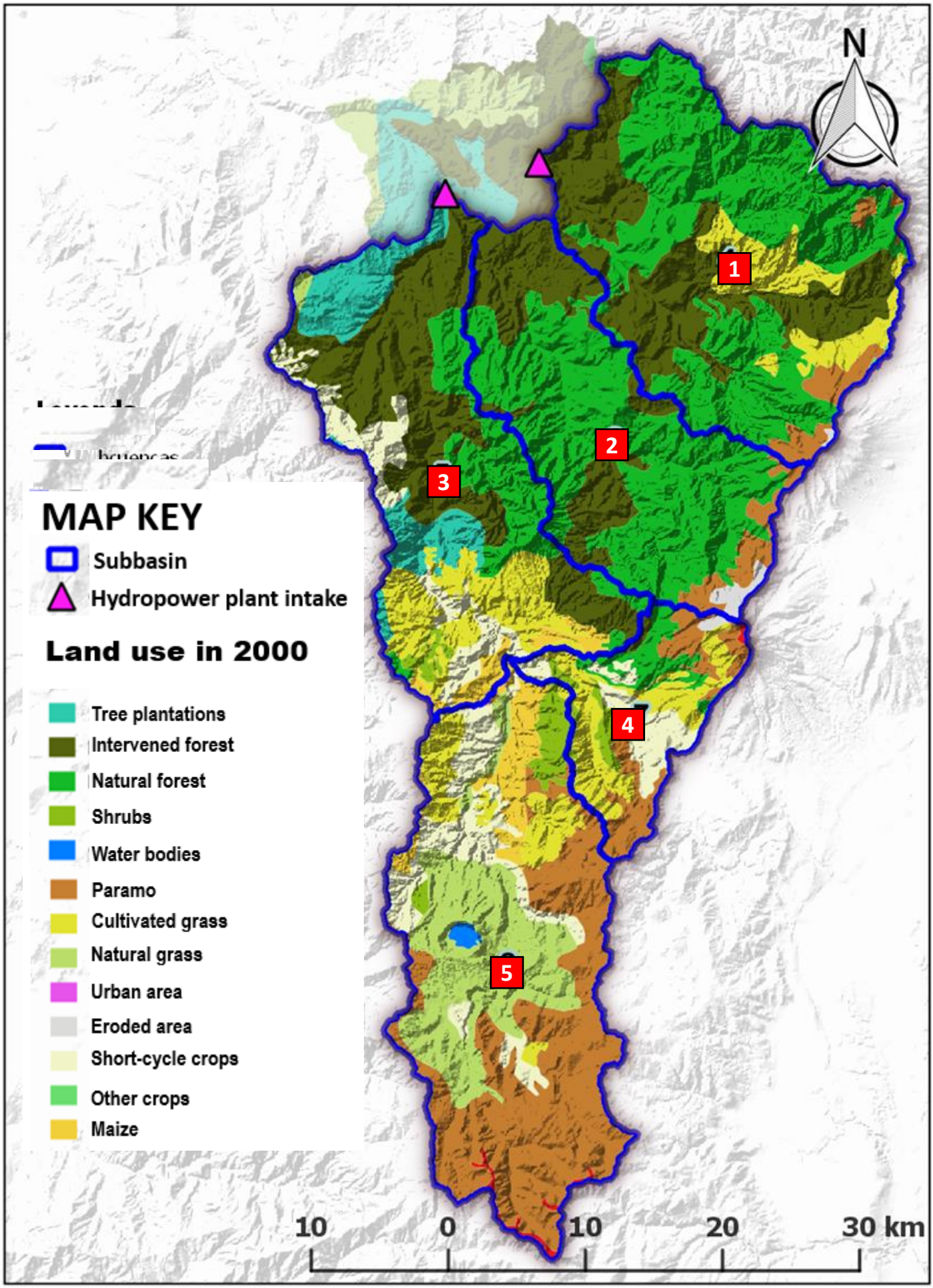
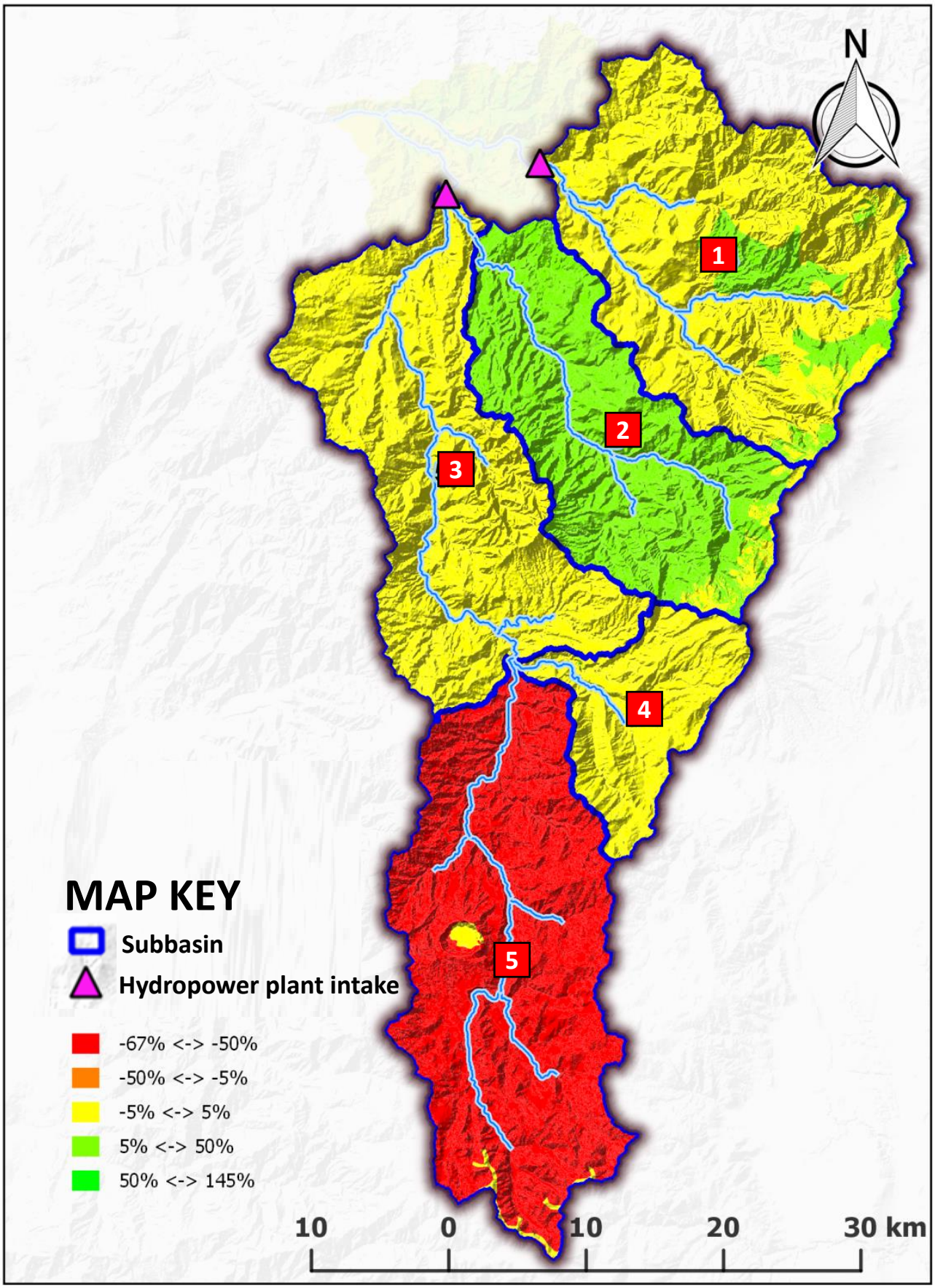
Annex 3. Maps.



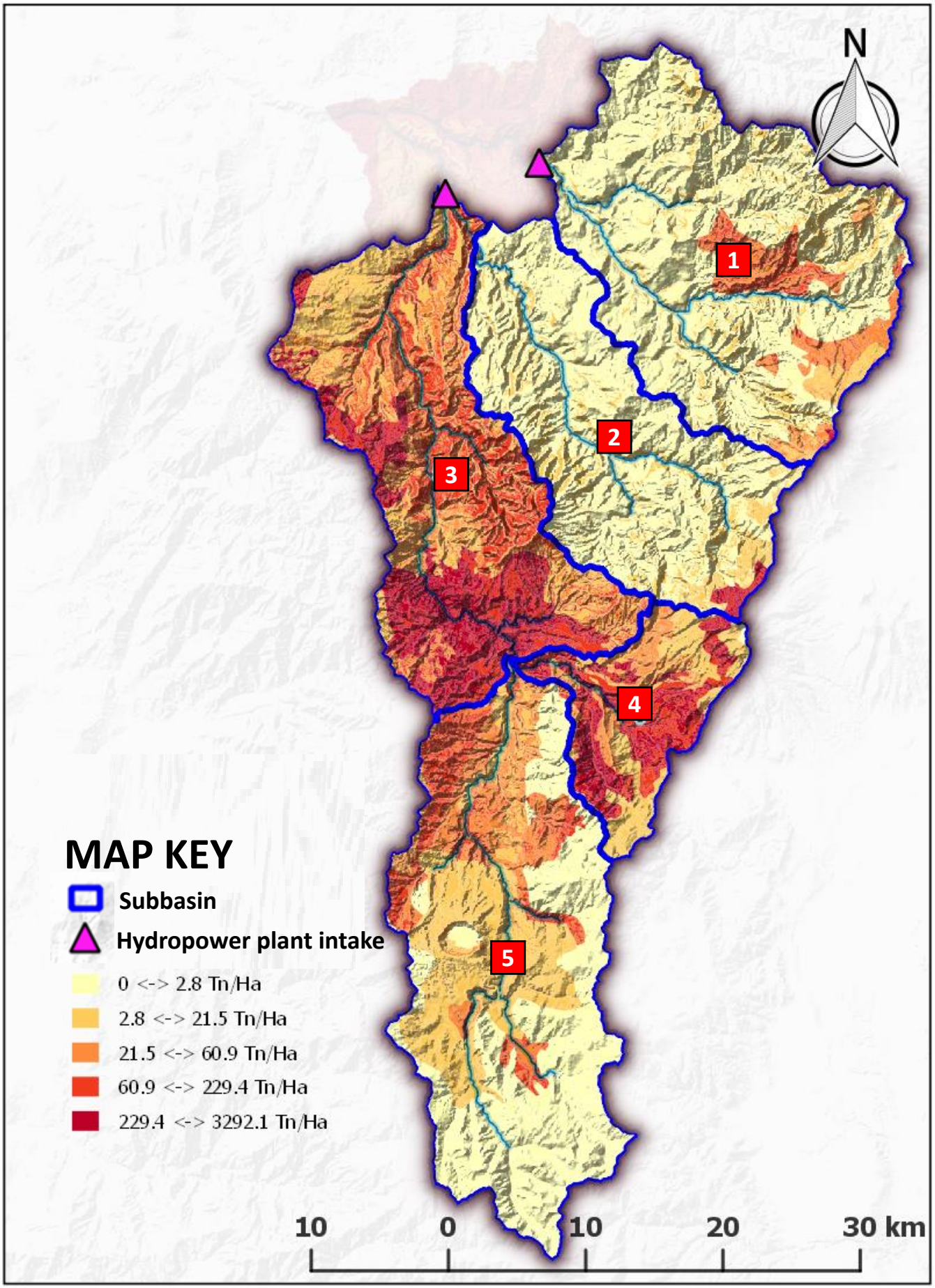
Map 1. Parishes and main localities in the Toachi - Pilatón water system.



Map 2. Land use in 2000 in the Toachi - Pilatón water system.



Map 3. Predicted change (percentage) in runoff during 2016 - 2035 with respect to the present condition in the Toachi - Pilatón water system.



Map 4. Predicted sediment contribution (metric tonnes per hectare) during 2016 - 2035 in the Toachi - Pilatón water system.

SISTEMATIZACIÓN DEL PROCESO DE SOCIALIZACIÓN

Para el proceso de sistematización se realizó en encuentros con los habitantes de las comunidades que se encuentran en las zonas de intervención.

En dichos encuentros se mencionaron los objetivos del proyecto, así como se recogieron las inquietudes y propuestas de los habitantes, esto tiene como fin realizar un proceso participativo que recopile la información necesaria en base a las necesidades reales de la comunidad, no solo frente a los problemas ocasionados por el cambio climático, sino también se consideran aspectos sociales, económicos y organizativos.

En estos procesos se contó con la participación activa de la comunidad. Se hicieron presentes hombres y mujeres y adultos mayores.

A continuación un resumen de estas propuestas y sugerencias que surgieron de parte de las comunidades

Propuestas:

- Que sea un proyecto que proteja las fuentes de agua, en especial las que se encuentran en la zona alta.
- Que motive a los agricultores cambiar sus sistemas productivos principalmente en las orillas de los ríos.
- Que se identifiquen los ojos de agua y priorizar su conservación.
- Que se impulse a los agricultores a iniciar los trámites de legalización en el caso de no contar con los documentos de legalización.
- Sería importante incluir cambio climático en la planificación del territorio.
- Es indispensable iniciar procesos de fortalecimiento de capacidades.

Comentarios generales recogidos en los eventos:

- Se debe fortalecer los procesos participativos y organizativos en las diferentes comunidades para asegurar el empoderamiento de las acciones a implementarse.
- Fortalecer los procesos de capacitación y transferencia de tecnología, en un idioma comprensible y práctico.
- Fortalecer el trabajo interinstitucional para complementar acciones en territorio y no se hagan dobles esfuerzos.

Luego del análisis de las propuestas de los compañeros y compañeras asistentes a estos encuentros, podemos concluir que el levantamiento de información inicial fue acertado y que recoge las necesidades de la comunidad.

El proyecto MATCH, tiene contemplado dentro de sus acciones, los procesos de capacitación y fortalecimiento de capacidades, así como la implementación de medidas de adaptación que serán complementadas por acciones paralelas.

Ministerio del Ambiente

ACTA REUNIÓN PROYECTO "REDUCCIÓN DE LA VULNERABILIDAD DE LA CENTRAL HIDROELÉCTRICA TOACHI PILATÓN ANTE LOS EFECTOS DEL CAMBIO CLIMÁTICO BAJO UN ENFOQUE DE MANEJO INTEGRAL ADAPTATIVO DE CUENCAS HIDROGRÁFICAS – MATCH"

Presente.-

La Dirección Nacional de Adaptación al Cambio Climático de la Subsecretaria de Cambio Climático del Ministerio del Ambiente del Ecuador, tiene como objetivo aumentar la resiliencia de los sistemas sociales, económicos y naturales frente al impacto del cambio climático, a través de la gestión de políticas, programas, acciones y proyectos de adaptación al cambio climático.

En este contexto, la Dirección Nacional de Adaptación al Cambio Climático ejecutó el proyecto "Análisis de la vulnerabilidad de centrales hidroeléctricas emblemáticas ante los efectos del cambio climático en siete subcuencas hidrográficas del Ecuador" en el Proyecto Hidroeléctrico Toachi Pilatón, y en la actualidad desarrolla el proyecto de implementación "Reducción de la vulnerabilidad de la central hidroeléctrica Toachi Pilatón ante los efectos del cambio climático bajo un enfoque de Manejo Integral Adaptativo de Cuencas Hidrográficas - MATCH", el cual tiene como fin, contribuir a la sostenibilidad de centrales hidroeléctricas a través de medidas de adaptación al cambio climático que permitan preservar la inversión realizada por el estado en hidroenergía, y mejorar la resiliencia de los sistemas sociales, económicos y naturales que existen en la cuenca aportante a la central hidroeléctrica. Este proyecto se encuentra enmarcado en la Estrategia Nacional de Cambio Climático, Plan Nacional de Cambio Climático y cambio de matriz energética del Ecuador.

Bajo los antecedentes antes mencionados se realiza la presente reunión referente al proyecto bajo la siguiente agenda:

- Presentación de los asistentes.
- Antecedentes
- Presentación del proyecto
- Preguntas
- Acuerdos

Llegan a los siguientes acuerdos:

- Reconocer y ratificar el proyecto "Reducción de la vulnerabilidad de la central hidroeléctrica Toachi Pilatón ante los efectos del cambio climático bajo un enfoque de Manejo Integral Adaptativo de Cuencas Hidrográficas – MATCH", el cual inserta medidas de adaptación que aumentan la resiliencia de la cuenca hidrográfica ante los efectos del cambio climático.
- Continuar el proceso de participación en la construcción de la propuesta del proyecto entre las partes en cuestión.

Ministerio del Ambiente

ANEXO No. 1 / Polo Quemado

OBSERVACIONES.-

- Transferir tecnología para opciones productivas como hornos para caña de manera que no se talen los árboles.
- Mirar dentro de la cadena productiva mejoras o cambiar de producto para finqueros a lo largo del río.
- Legalización de predios por reforestar un área del predio a cambio.

Ministerio del Ambiente

ANEXO No. 1 / Pampas de Aguilla o Las Pampas

OBSERVACIONES.-

- Ordenar las obras de los ríos de mejor manera en función de los intereses con los finqueros.
- Cuidar los ojos de agua en las zonas altas.
- Involucrar a los actores y tomadores de decisiones en el manejo integral de la cuenca
- Mirar como opción para implementar cercas eléctricas o vaciaderos.

Ministerio del Ambiente

ANEXO No. 1 / Sigchos

OBSERVACIONES.-

- Revisar los focos de agua para priorizar las áreas de reforestación, junto con el mapeo de comunidades.
- Manejo de cuencas - competencias compartidas entre el GAD de Sigchos y SENAGUA
- Documento de perfil de proyecto para continuar con un convenio.
- Cómo se podría incluir CC dentro de PDOT.
- Transferir guía metodológica de PDOT - inclusión de CC

Ministerio del Ambiente

CARTA GOBIERNO AUTÓNOMO DESCENTRALIZADO DE MANUEL CRONEJO ASTORGA (TANDAPI), CANTÓN MEJÍA, PROVINCIA DE PICHINCHA PARA EL PROYECTO "REDUCCIÓN DE LA VULNERABILIDAD DE LA CENTRAL HIDROELÉCTRICA TOACHI PILATÓN ANTE LOS EFECTOS DEL CAMBIO CLIMÁTICO BAJO UN ENFOQUE DE MANEJO INTEGRAL ADAPTATIVO DE CUENCAS HIDROGRÁFICAS – MATCH"

Presente.-

La Dirección Nacional de Adaptación al Cambio Climático de la Subsecretaría de Cambio Climático del Ministerio del Ambiente del Ecuador, tiene como objetivo aumentar la resiliencia de los sistemas sociales, económicos y naturales frente al impacto del cambio climático, a través de la gestión de políticas, programas, acciones y proyectos de adaptación al cambio climático.

En este contexto, la Dirección Nacional de Adaptación al Cambio Climático ejecutó el proyecto "Análisis de la vulnerabilidad de centrales hidroeléctricas emblemáticas ante los efectos del cambio climático en siete subcuencas hidrográficas del Ecuador" en el Proyecto Hidroeléctrico Toachi Pilatón, y en la actualidad desarrolla el proyecto de implementación "Reducción de la vulnerabilidad de la central hidroeléctrica Toachi Pilatón ante los efectos del cambio climático bajo un enfoque de Manejo Integral Adaptativo de Cuencas Hidrográficas - MATCH", el cual tiene como fin, contribuir a la sostenibilidad de centrales hidroeléctricas a través de medidas de adaptación al cambio climático que permitan preservar la inversión realizada por el estado en hidroenergía, y mejorar la resiliencia de los sistemas sociales, económicos y naturales que existen en la cuenca aportante a la central hidroeléctrica. Este proyecto se encuentra enmarcado en la Estrategia Nacional de Cambio Climático, Plan Nacional de Cambio Climático y cambio de matriz energética del Ecuador.

Bajo los antecedentes antes mencionados el Gobierno Autónomo Descentralizado de la Parroquia Manuel Cornejo Astorga (Tandapi), del Cantón Mejia, provincia de Pichincha, reconoce y ratifica el proyecto "Reducción de la vulnerabilidad de la céntral hidroeléctrica Toachi Pilatón ante los efectos del cambio climático bajo un enfoque de Manejo Integral Adaptativo de Cuencas Hidrográficas – MATCH", el cual inserta medidas de adaptación que aumentan la resiliencia de la cuenca hidrográfica ante los efectos del cambio climático.

Sr. Patricio Ruiz

Presidente Gobierno Autónomo Descentralizado

de la Parroquia Manuel Cornejo Astorga (Tandapi)

Ministerio del Ambiente

CARTA GOBIERNO AUTÓNOMO DESCENTRALIZADO DE PALO QUEMADO, CANTÓN SIGCHOS, PROVINCIA DE COTOPAXI PARA EL PROYECTO "REDUCCIÓN DE LA VULNERABILIDAD DE LA CENTRAL HIDROELÉCTRICA TOACHI PILATÓN ANTE LOS EFECTOS DEL CAMBIO CLIMÁTICO BAJO UN ENFOQUE DE MANEJO INTEGRAL ADAPTATIVO DE CUENCAS HIDROGRÁFICAS – MATCH"

Presente.-

La Dirección Nacional de Adaptación al Cambio Climático de la Subsecretaría de Cambio Climático del Ministerio del Ambiente del Ecuador, tiene como objetivo aumentar la resiliencia de los sistemas sociales, económicos y naturales frente al impacto del cambio climático, a través de la gestión de políticas, programas, acciones y proyectos de adaptación al cambio climático.

En este contexto, la Dirección Nacional de Adaptación al Cambio Climático ejecutó el proyecto "Análisis de la vulnerabilidad de centrales hidroeléctricas emblemáticas ante los efectos del cambio climático en siete subcuencas hidrográficas del Ecuador" en el Proyecto Hidroeléctrico Toachi Pilatón, y en la actualidad desarrolla el proyecto de implementación "Reducción de la vulnerabilidad de la central hidroeléctrica Toachi Pilatón ante los efectos del cambio climático bajo un enfoque de Manejo Integral Adaptativo de Cuencas Hidrográficas - MATCH", el cual tiene como fin, contribuir a la sostenibilidad de centrales hidroeléctricas a través de medidas de adaptación al cambio climático que permitan preservar la inversión realizada por el estado en hidroenergía, y mejorar la resiliencia de los sistemas sociales, económicos y naturales que existen en la cuenca aportante a la central hidroeléctrica. Este proyecto se encuentra enmarcado en la Estrategia Nacional de Cambio Climático, Plan Nacional de Cambio Climático y cambio de matriz energética del Ecuador.

Bajo los antecedentes antes mencionados el Gobierno Autónomo Descentralizado de la Parroquia Palo Quemado, Cantón Sigchos, Provincia de Cotopaxi, reconoce y ratifica el proyecto "Reducción de la vulnerabilidad de la central hidroeléctrica Toachi Pilatón ante los efectos del cambio climático bajo un enfoque de Manejo Integral Adaptativo de Cuencas Hidrográficas – MATCH", el cual inserta medidas de adaptación que aumentan la resiliencia de la cuenca hidrográfica ante los efectos del cambio climático.

PARROQUIAL RURAL PALO QUEMADO
COTOPAXI - ECUADOR

Sr. Rodrigo Changoluisa

Gobierno Autónomo Descentralizado

de la Parroquia Palo Quemado

Ministerio del Ambiente

CARTA GOBIERNO AUTÓNOMO DESCENTRALIZADO DE PAMPAS DE AGUILLA, CANTÓN SIGCHOS, PROVINCIA DE COTOPAXI PARA EL PROYECTO "REDUCCIÓN DE LA VULNERABILIDAD DE LA CENTRAL HIDROELÉCTRICA TOACHI PILATÓN ANTE LOS EFECTOS DEL CAMBIO CLIMÁTICO BAJO UN ENFOQUE DE MANEJO INTEGRAL ADAPTATIVO DE CUENCAS HIDROGRÁFICAS – MATCH"

Presente.-

La Dirección Nacional de Adaptación al Cambio Climático de la Subsecretaría de Cambio Climático del Ministerio del Ambiente del Ecuador, tiene como objetivo aumentar la resiliencia de los sistemas sociales, económicos y naturales frente al impacto del cambio climático, a través de la gestión de políticas, programas, acciones y proyectos de adaptación al cambio climático.

En este contexto, la Dirección Nacional de Adaptación al Cambio Climático ejecutó el proyecto "Análisis de la vulnerabilidad de centrales hidroeléctricas emblemáticas ante los efectos del cambio climático en siete subcuencas hidrográficas del Ecuador" en el Proyecto Hidroeléctrico Toachi Pilatón, y en la actualidad desarrolla el proyecto de implementación "Reducción de la vulnerabilidad de la central hidroeléctrica Toachi Pilatón ante los efectos del cambio climático bajo un enfoque de Manejo Integral Adaptativo de Cuencas Hidrográficas - MATCH", el cual tiene como fin, contribuir a la sostenibilidad de centrales hidroeléctricas a través de medidas de adaptación al cambio climático que permitan preservar la inversión realizada por el estado en hidroenergía, y mejorar la resiliencia de los sistemas sociales, económicos y naturales que existen en la cuenca aportante a la central hidroeléctrica. Este proyecto se encuentra enmarcado en la Estrategia Nacional de Cambio Climático, Plan Nacional de Cambio Climático y cambio de matriz energética del Ecuador.

Bajo los antecedentes antes mencionados el Gobierno Autónomo Descentralizado de la Parroquia Pampas de Aguilla, Cantón Sigchos, Provincia de Cotopaxi, reconoce y ratifica el proyecto "Reducción de la vulnerabilidad de la central hidroeléctrica Toachi Pilatón ante los efectos del cambio climático bajo un enfoque de Manejo Integral Adaptativo de Cuencas Hidrográficas – MATCH", el cual inserta medidas de adaptación que aumentan la resiliencia de la cuenca hidrográfica ante los efectos del cambio climático.

Sr. Mario Porras

Gobierno Autónomo Descentralizado

de la Parroquia Pampas de Aguilla

Ministerio del Ambiente	MINISTERIO DEL AMBIENTE Sistema de Gestión de Procesos	
Fecha de revisión:	REGISTRO DE ASISTENCIA	Código: MAE-REG-PRO-01.6
Versión: 02		Página: 1

EVENTO: Presentación Proyecto MATCH - GAD Tandapi

LISTA DE PARTICIPANTES

FECHA: 04/03/2015 HORA: 11:30

N°	NOMBRE	CARGO	INSTITUCIÓN / ÁREA MAE	CORREO ELECTRONICO	TELEFONOS	FIRMA
1	Nicolás Zambrano	Proyecto Contratado CAECC	SCC - MAE	carlos.zambrano ambiente.gob.ec	0987146547	[firma]
2	Julio H Vega	UCE PRES.	GAD. Parroquial Tandapi		0992504450	[firma]
3	Bayardo Enríquez	TEC AMBIENTAL	CELEC - HIDROTAPI	bayardo.enriquez@celec.gob.ec	0986462737	[firma]
4	Luis Paredes C.	Fiscalizador Ambiental	CELEC EP - HIDROTAPI	luis.paredes@celec.gob.ec	0984666555	[firma]
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Ministerio del Ambiente	MINISTERIO DEL AMBIENTE Sistema de Gestión de Procesos	
Fecha de revisión:	REGISTRO DE ASISTENCIA	Código: MAE-REG-PRO-01.6
Versión: 02		Página: 1

EVENTO: Presentación Proyecto MATCH - GAD Palo Quemado

LISTA DE PARTICIPANTES

FECHA: 03/09/2015 HORA: 17:00

N°	NOMBRE	CARGO	INSTITUCIÓN / ÁREA MAE	CORREO ELECTRONICO	TELEFONOS	FIRMA
1	Nicolás Zambrano	Coordinador Proyecto CHECC	MAE - SCC	carlos.zambrano@ambiente.gob.ec	0987176597	[firma]
2	América Ortiz	Presidenta Praderas del Toachi	Praderas del Toachi		0999569946	[firma]
3	Marco Changoluisa	Vocal	GAD. PARROQUIAL	marcochangoluisa1976@gmail.com	0995282428	[firma]
4	Rodrigo Changoluisa	Presidente	GAD P. R. Palo Quemado	rodrigochangoluisa1429@yahoo.es	0994180465	[firma]
5	Lennis Yugsi	Secretaria - Tesorera	GAD. P.R. PALO QUEMADO	ylennisdirabelu@yahoo.com	0980141143	[firma]
6	Manuel Heredia	VOCAL	GAD. P.R.	califeredia12@hotmail.com	0991471457	[firma]
7	Rosa Manzambuto	Vicepresidenta GADPRPQ	GADPR P.Q	rosita0021@yahoo.es	0992599408	[firma]
8	Lucía Paredes	Especialista Ambiental	CELEC EP HIDROTOAPI	luciaparedes@celec.gob.ec	0981666855	[firma]
9						

Ministerio del Ambiente	**MINISTERIO DEL AMBIENTE** Sistema de Gestión de Procesos	
Fecha de revisión:	REGISTRO DE ASISTENCIA	Código: MAE-REG-PRO-01.6
Versión: 02		Página: 1

EVENTO: Presentación Proyecto MATCH-GAD Las Pampas

LISTA DE PARTICIPANTES **FECHA:** 03/09/15 **HORA:** 19:00

N°	NOMBRE	CARGO	INSTITUCIÓN / ÁREA MAE	CORREO ELECTRONICO	TELEFONOS	FIRMA
1	Nicolás Zaumbrano	Coordinador Proyecto SIECC	MAE - SCC	Carlos.zambrano@ambiente.gob.ec	0987176549	
2	Mario Parras	Presidente	GAD Las Pampas.	mario.parras1968@hotmail.com	0981473252	
3	Elizabeth Ati	Secretaria Tesorera	GAD Las Pampas	sr.elizabeth@hotmail.com		
4	Joaquín Sayaid	Vocal	GAD Las Pampas		0992872668	
5	Leodan Parras	Vicepresidente	GAD Las Pampas	leodanparras@hotmail.com	0979401165	
6	Mesias Guillen	Vocal	GAD Las Pampas	mesiasguillen@hotmail.com	0990834421	
7	Carlos Hernandez	Vocal	GAD Las Pampas		0995209522	
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Ministerio del Ambiente	**MINISTERIO DEL AMBIENTE** Sistema de Gestión de Procesos	
Fecha de revisión:	**REGISTRO DE ASISTENCIA**	**Código:** MAE-REG-PRO-01.6
Versión: 02		**Página:** 1

EVENTO: Presentación Proyecto MATCH - GAD Sigchos

LISTA DE PARTICIPANTES **FECHA:** 03/09/15 **HORA:** 10:00

N°	NOMBRE	CARGO	INSTITUCIÓN / ÁREA MAE	CORREO ELECTRONICO	TELEFONOS	FIRMA
1	Nicolás Zambrano	Coordinador Proyecto CHECC	MAE - SCC	Carlos.zambrano@ambiente.gob.ec	3987600 ext 1315	
2	Carlos Pacheco	Director Desarrollo TI	GADIMS	carlospachecoB26@yahoo.es	0991481927	
3	Tatiana Ortiz	Coordinadora Técnica	GADHS	[illegible]	0984465850	
4	Lucía Posso C.	Especialista Biodiversidad	CELEC EP - HIDROPAUTE	lucia.posso@celec.gob.ec	0984666855	
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Proyecto para potenciar la resiliencia al cambio climático en la cuenca hídrica Toachi - Pilatón

Memoria

Taller inicial de formulación

Unión del Toachi

República del Ecuador

15 de julio de 2016

Tabla de contenido

Anexos

Introducción

El Ministerio del Ambiente de Ecuador (MAE), en colaboración con CAF - Banco de Desarrollo de América Latina – van a presentar al Fondo de Adaptación la propuesta del proyecto para potenciar la resiliencia al cambio climático en la cuenca hídrica Toachi – Pilatón. El Fondo de Adaptación fue establecido en 2001 para financiar proyectos y programas concretos de adaptación en los países en desarrollo. El fondo es un mecanismo financiero de la Convención Marco de las Naciones Unidas sobre el Cambio Climático y el Protocolo de Kioto.

La iniciativa ha sido conceptualizada por el MAE, quien ha realizado consultas preliminares a varios actores públicos y privados. El MAE tiene información sobre el probable impacto del cambio climático en el sistema hídrico Toachi – Pïlatón a partir de los resultados del proyecto "análisis de la vulnerabilidad de las centrales hidroeléctricas priorizadas ante los efectos del cambio climático" que fue realizado por la empresa TECNALIA. Complementariamente, en julio de 2016 se realizó un sondeo preliminar de los actores locales que sirva de base para realizar un primer taller de consulta para analizar las ideas iniciales del MAE.

Se prevé presentar el concepto de proyecto al Fondo de Adaptación a finales de julio de 2016 con miras a que sea aprobado en la 28 reunión de la junta directiva del Fondo de Adaptación que se realizará el 4 de octubre de 2016 en Bonn (Alemania). A efectos de avanzar en la preparación del concepto, se requiere analizar las ideas iniciales con los actores claves públicos y privados. Consecuentemente, se organizó el taller inicial en la localidad Unión del Toachi con el objetivo de presentar las ideas del concepto a los posibles socios clave, recibir retroalimentación e iniciar el proceso de preparar la propuesta de concepto para ser presentado hasta el 01 de agosto de 2016[1].

El taller se realizó en la casa comunal de la localidad Unión del Toachi (Foto 1).

Agenda

La reunión tuvo los siguientes elementos:

08:30 h Registro de participantes

09:00 h Bienvenida

09:15 h Presentación de participantes

09:30 h Revisión de la agenda

09:45 h Introducción al cambio climático

10:00 h El Fondo de Adaptación

10:15 h Cambio climático en la cuenca Toachi – Pilatón

10:30 h Concepto de proyecto

11:00 h Trabajo en grupo. Análisis de situación

[1] Fecha límite para ingresar propuestas a ser consideradas en 28 reunión de la junta directiva del Fondo de Adaptación.

12:00 h Presentación de los grupos

13:00 h Almuerzo

14:00 h Trabajo en grupo. Acciones del proyecto

15:00 h Presentación de los grupos

16:00 h Próximos pasos

16:30 h Cierre

Bienvenida

La bienvenida estuvo a cargo de Nicolás Zambrano del Ministerio del Ambiente y Dayana Vega de CAF (Foto 2 y Foto 3), quienes agradecieron la asistencia de los participantes y proveyeron información sobre el marco general de la reunión. Participaron en la reunión 39 personas, el registro de asistencia está en el Anexo 1.

Introducción al cambio climático

La presentación estuvo a cargo de Nicolás Zambrano del MAE, quien explicó el cambio climático global y sus impactos en Ecuador. También resumió el marco político e institucional en el que se desarrollan las acciones de mitigación y adaptación al cambio climático.

El Fondo de Adaptación

La presentación estuvo a cargo de Segundo Coello, consultor de CAF a cargo de la preparación del proyecto. Se explicó el alcance y forma de operación del Fondo de Adaptación. Se indicó que CAF, además de su rol como banco de desarrollo, es una Agencia Implementadora Regional y está articulando la preparación de la propuesta del presente proyecto.

Cambio climático en la cuenca Toachi – Pilatón

La presentación estuvo a cargo de Nicolás Zambrano del MAE (Foto 4), quien explicó con los mapas disponibles para los grupos (Anexo 2) que el escenario futuro podría ser disminución de la precipitación e incremento de la escorrentía de sedimentos. En porcentaje la mayor disminución de precipitación sería en la parte alta de la cuenca del río Toachi. La disminución de precipitación en la parte baja de ambas cuencas es menor en porcentaje, pero este sector tiene mucha mayor precipitación. Además, hay fuerte presión de deforestación en los bosques de la estribación, lo que agravaría la situación.

Concepto de proyecto

La presentación estuvo a cargo de Segundo Coello, consultor de CAF, quien resumió la propuesta de marco de resultados y presupuesto que se ha esbozado al momento. El proyecto tendría tres componentes: (i) conservar la cobertura vegetal existente, (ii) adaptar las actividades productivas a las nuevas condiciones derivadas del cambio climático y (iii) robustecer las capacidades locales para implementar medidas de adaptación al cambio climático. El proyecto generaría tres resultados y siete productos, tendría una

duración de cuatro años y requeriría un financiamiento de unos USD2.4 millones. Se destacó que el proyecto está a nivel de idea y que los recursos no reembolsables disponibles son limitados, por lo que es necesario priorizar estratégicamente la intervención a realizar.

Se indicó que luego de presentar el concepto al Fondo de Adaptación, se deberá trabajar en desarrollar el proyecto durante los próximos meses. Se trataría de tener listo el documento de proyecto para presentarlo al Fondo de Adaptación en diciembre de 2016, con miras a que sea aprobado en los primeros meses de 2017.

Mesas de trabajo

Los participantes conformaron dos grupos de trabajo que analizaron la cuenca del río Toachi (grupo 1) y la cuenca del río Pilatón (grupo 2). Los grupos realizaron dos sesiones de trabajo, luego de cada sesión se realizó una presentación de resultados en plenaria para tener comentarios y recomendaciones de los demás participantes.

Primera sesión de trabajo en grupo. Análisis de situación

Cuenca del río Toachi

El grupo de cuenca del río Toachi (Foto 5 y Foto 6) indicó que, en efecto, hay un severo problema de deforestación en la cuenca. A esto se suma la invasión de zonas boscosas para ampliar el área agrícola. Se indicó que los bosques protectores existen sólo en papel pues no hay manejo y están muy intervenidos. Igualmente, se indicó que la Reserva Ecológica Los Ilinizas estaría invadida en un 65%.

Los productores de caña de azúcar indicaron que cada finquero usa unos tres árboles semanales para la producción de panela. La madera ha escaseado y cada vez hay que traerla de más lejos o comprarla. La Asociación Flor de Caña de la localidad de Palo Quemado, está trabajando con Maquita Cushunchic para desarrollar la producción de panela orgánica con miras a exportación. Los finqueros están interesados en incorporar tecnología para mejorar la producción. Se está pensando en buscar un combustible alternativo para cocinar el jugo de caña.

La producción agropecuaria tiene bajos rendimientos, predominan los sistemas de producción extensivos. Es común la siembra en laderas y la invasión de las riberas de los ríos. Se considera que un incentivo para que los agricultores se interesen en reforestar y conservar el bosque es apoyarles para incrementar los rendimientos por hectárea.

Se recomendó que las acciones de reforestación se centren en las pendientes y en recuperar las riberas de los ríos principales y sus aportantes. Se resaltó que es indispensable asegurar el cuidado de las plantas que se siembren, no sólo enfocarse en plantar, sino en cuidarles los primeros dos o tres años.

Con respecto a la idea de robustecer la gestión de los bosques protectores existentes, se recomendó enfocarse en los bosques protectores Toachi – Pilatón y Zarapullo. También sería necesario considerar robustecer la gestión de la reserva Los Illinizas que está en muy mal estado.

Con respecto a la idea de presas artesanales de retención de sólidos, los participantes consideran que tal vez no serían necesarias. Se mencionó que incluso podrían ser destruidas por las fuertes corrientes del invierno. No obstante, se recomendó no excluir la idea del concepto de proyecto. Hay que tener un mejor criterio técnico sobre la utilidad de este tipo de presas en el sistema hídrico Toachi – Pilatón. En todo caso, se destacó que, aunque sean unidades artesanales, será necesario que haya un diseño de ingeniería para asegurar su adecuado funcionamiento.

Con respecto a mejorar los cultivos, se recomendó que se cubra todo el sector desde Sigchos hasta la Unión del Toachi. De ser posible valdría considerar mejoras en los sistemas de riego e incentivar el agroturismo.

Los participantes estuvieron de acuerdo en que hay que mejorar la recopilación de información climatológica, pero destacaron que es necesario asegurar que la información llegue a los gobiernos locales y los pobladores.

Finalmente, el grupo indicó que hace falta mapas de mayor detalle para poder precisar las áreas de intervención.

Los resultados del trabajo en grupo están en la Figura 1.

Cuenca del río Pilatón

El grupo destacó que es necesario pensar en robustecer la conectividad de los hábitats y ecosistemas. Se planteó una serie de criterios para seleccionar los sitios de intervención del proyecto (Figura 2). Se planteó que el proyecto también considere intervenir en las zonas de riesgo de deslaves e inundaciones que existen en esta cuenca.

Con respecto a monitoreo climático, se recomendó repotenciar las estaciones meteorológicas existentes que no están operativas. Es probable que adicionalmente se requiera instalar alguna estación adicional, pero esto debe ser analizado con más detalle. El representante del INAMHI proporcionó un mapa de ubicación de las estaciones meteorológicas e hidrológicas en ambas cuencas (Anexo 4).

Segunda sesión de trabajo en grupo. Acciones del proyecto

Cuenca del río Toachi

Con respecto a áreas para ampliar la cobertura vegetal, el grupo anotó para cada parroquia las localidades que se deberían considerar (Figura 3). No obstante, hacen falta mapas con mayor detalle para ubicar los sitios. Se mencionó que la información sobre uso de suelo es del 2000 (Anexo 2) y no corresponde a la situación actual.

Con respecto a robustecer la gestión de áreas existentes, el grupo propuso que se considere la reserva Los Ilinizas, pero robusteciendo la gestión de la superficie existente pues hay reclamos por terrenos.

Con respecto a robustecer la producción agropecuaria, se propuso trabajar con mejoramiento de pastos en unas 250 h con la Asociación de Ganaderos de Las Pampas, y mejorar unas 200 ha de caña de azúcar con la Asociación Flor de Caña de Palo Quemado. Se recomendó incluir en el proyecto apoyar la mejora

tecnológica de la producción, en particular mejorar la eficiencia energética de la cocción del jugo de caña. También se propuso trabajar con los productores de Quinticusig (Sigchos), quienes producen vino de mortiño.

Con respecto a monitoreo climático, se sugirió incorporar dos estaciones de monitoreo en esta cuenca. Sin embargo, es necesario el criterio técnico del INAMHI.

Se estuvo de acuerdo en incorporar adaptación en los planes de desarrollo parroquial.

Finalmente, se recomendó que las acciones de comunicación y educación ambiental incorporen un componente de educación formal con escuelas y colegios. Además de considerar el uso de medios de comunicación locales y material informativo para el público en general.

Cuenca del río Pilatón

El grupo preparó un mapa hablado en el que se ubica los tributarios de la cuenca que se deberían analizar para intervención (Figura 4). Igualmente destacaron que la información de uso de suelo es muy antigua y que es necesario tener mapas actualizados con mayor detalle para poder decidir las áreas de intervención del proyecto.

Próximos pasos

Se destacó que el concepto será preparado teniendo en cuenta los resultados del taller y que será enviado al Fondo de Adaptación el viernes 29 de julio de 2016. Luego de esto se organizarán reuniones adicionales para precisar acciones con los grupos que se han identificado.

En octubre o noviembre habría un segundo taller con todos los actores clave para revisar el borrador de proyecto y preparar la versión final que se presentaría al Fondo de Adaptación en diciembre de 2016.

Cierre

La clausura estuvo a cargo de Nicolás Zambrano del MAE, quien agradeció los aportes y activa participación de los presentes.

Figuras

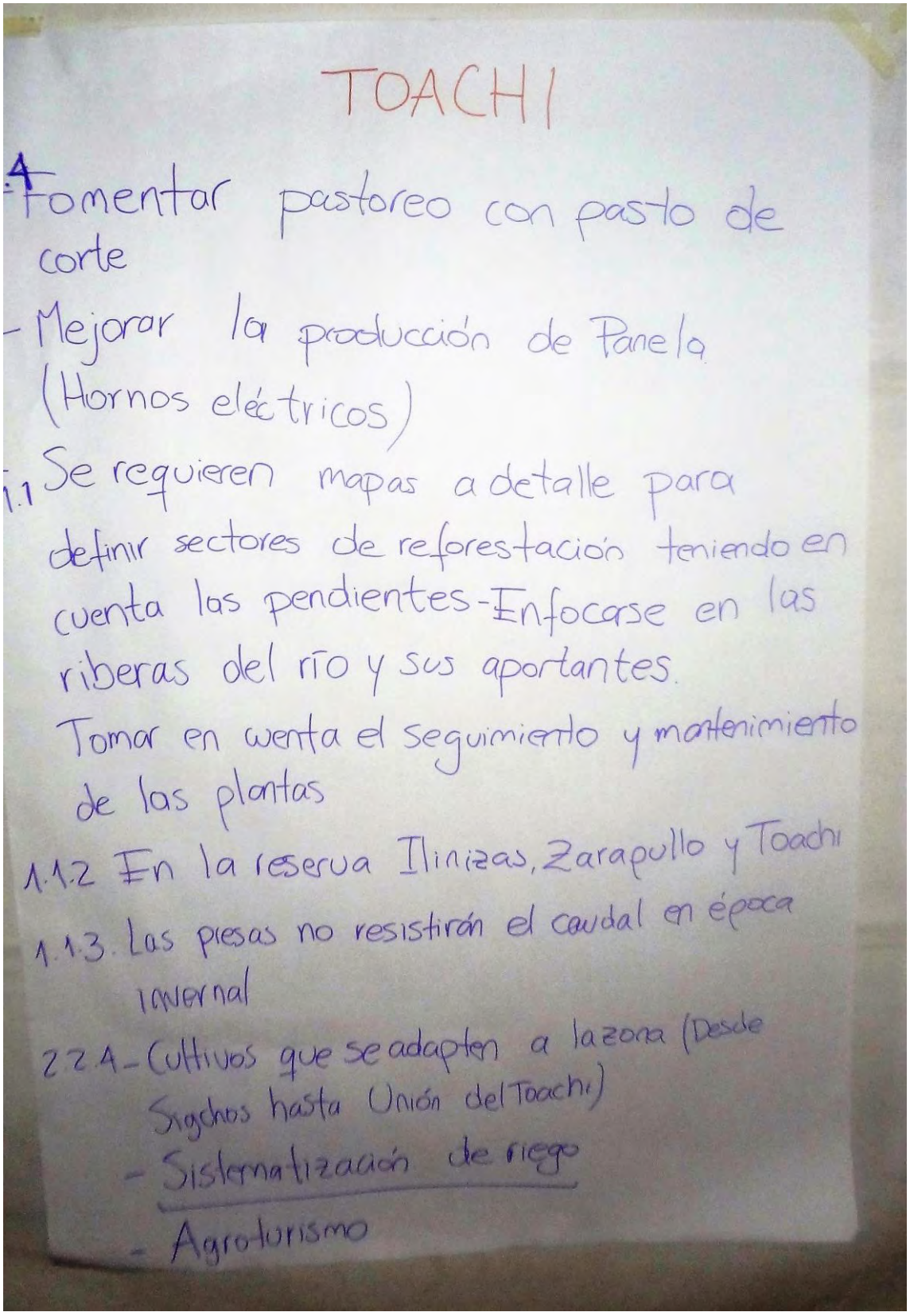

Figura 1. Resultados del trabajo del grupo 1 (cuenca del río Toachi) en la primera sesión de trabajo grupal.

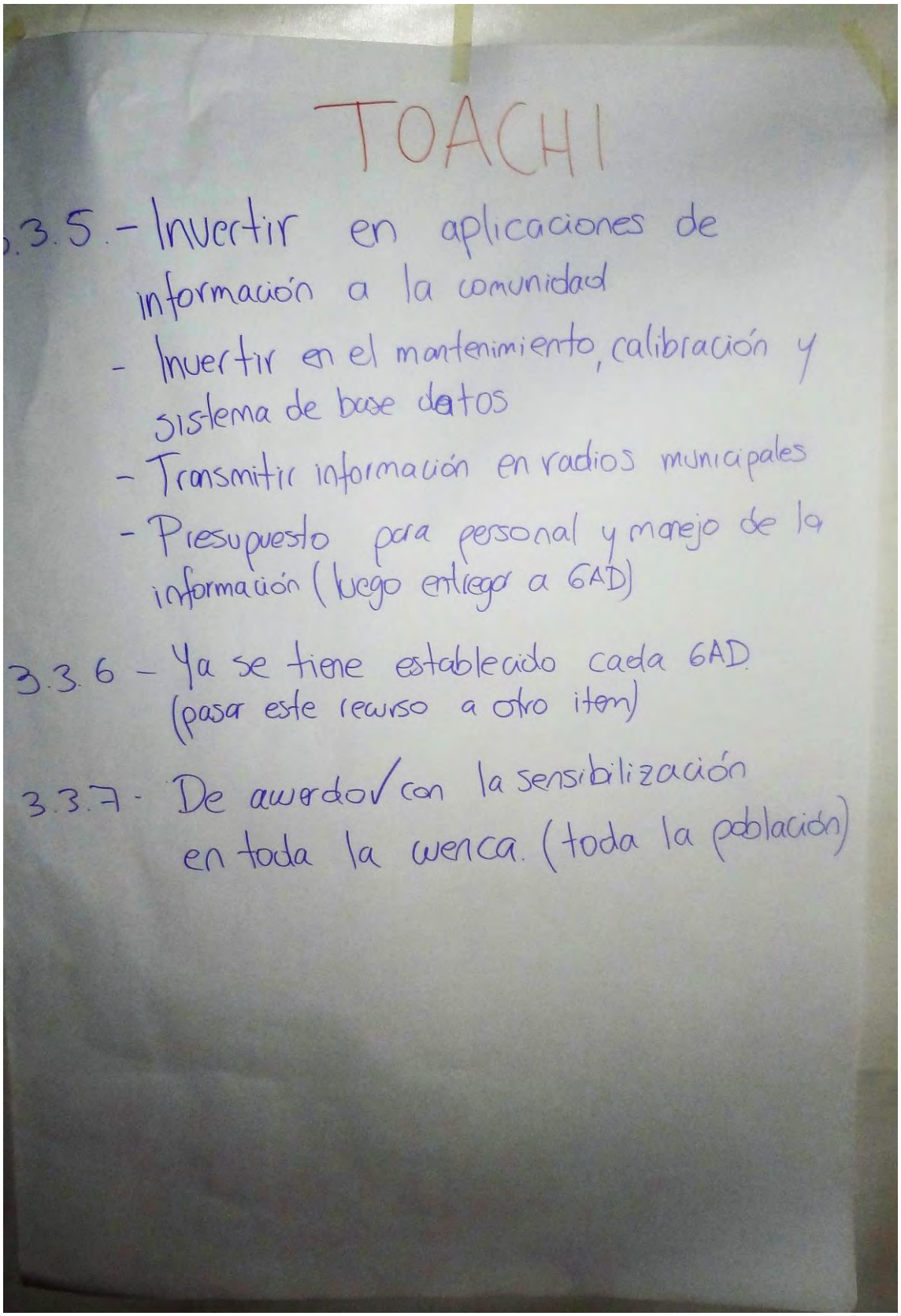

Figura 1. Continuación.

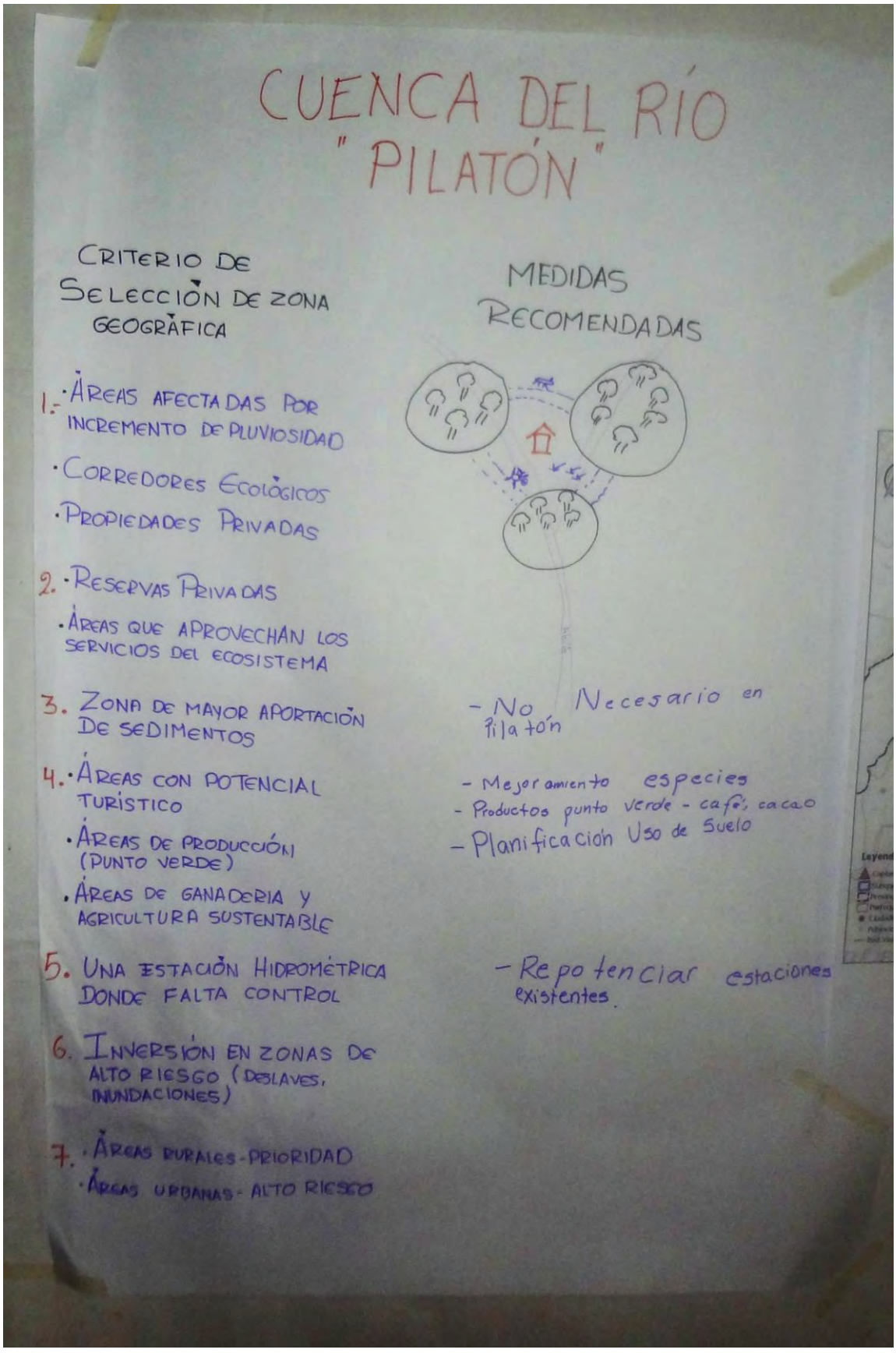

Figura 2. Resultados del trabajo del grupo 2 (cuenca del río Pilatón) en la primera sesión de trabajo grupal.

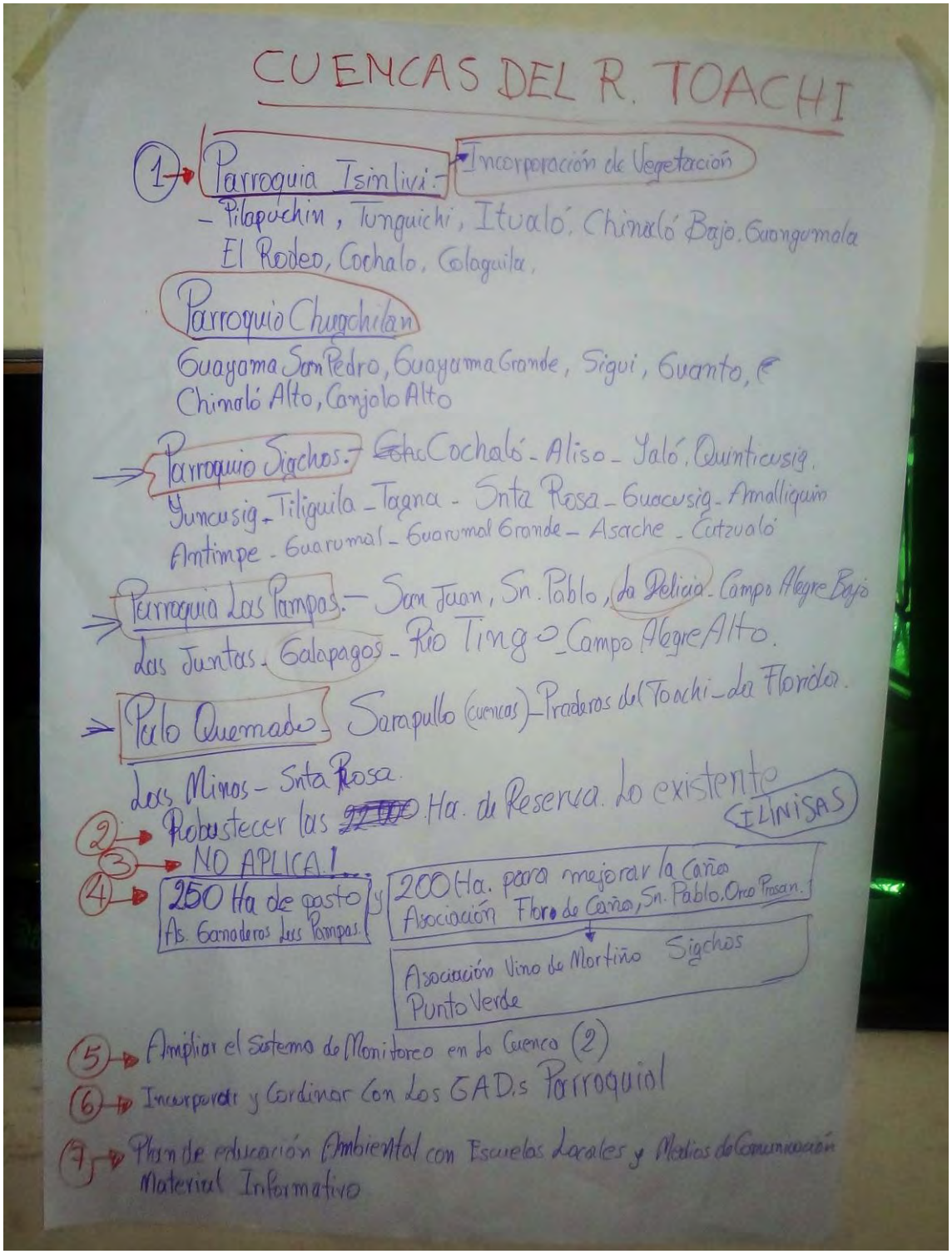

Figura 3. Resultados del trabajo del grupo 1 (cuenca del río Toachi) en la segunda sesión de trabajo grupal.

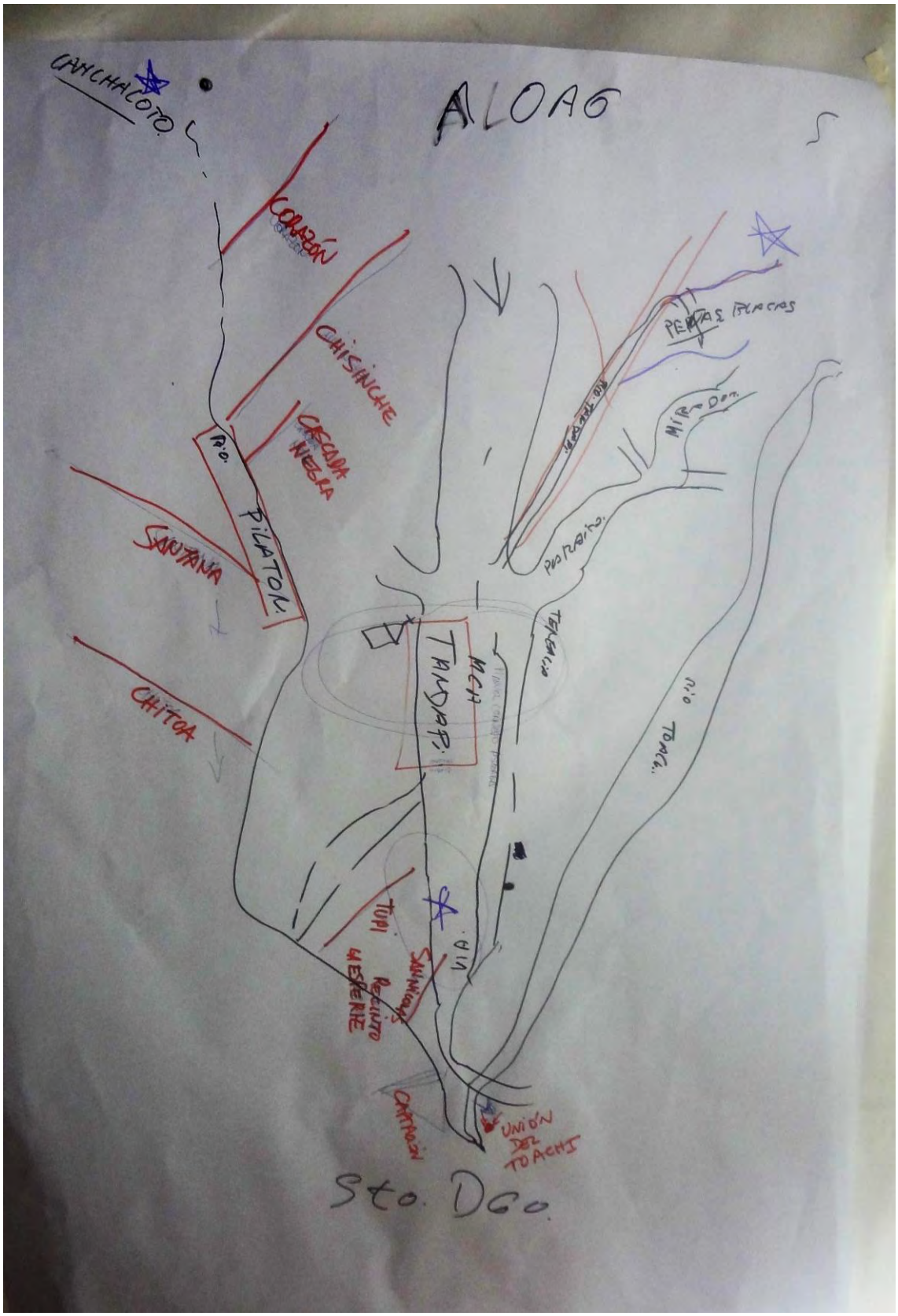

Figura 4. Resultados del trabajo del grupo 2 (cuenca del río Pilatón) en la segunda sesión de trabajo grupal.

Fotos

Foto 1. Casa comunal de la localidad de Unión del Toachi.

Foto 2. Bienvenida a cargo de Nicolás Zambrano del Ministerio del Ambiente.

Foto 3. Bienvenida a cargo de Dayana Vega de CAF.

Foto 4. Presentación de Nicolás Zambrano sobre los posibles impactos del cambio climático en el sistema hídrico Toachi - Pilatón.

Foto 5. Primera sesión de trabajo, grupo 1 (río Toachi).

Foto 6. Primera sesión de trabajo, grupo 1 (río Toachi). Presentación de resultados.

Foto 7. Primera sesión de trabajo, grupo 2 (río Pilatón).

Foto 8. Primera sesión de trabajo, grupo 2 (río Pilatón). Presentación de resultados.

Foto 9. Segunda sesión de trabajo, grupo 1 (río Toachi).

Foto 10. Segunda sesión de trabajo, grupo 1 (río Toachi). Presentación de resultados.

Foto 11. Segunda sesión de trabajo, grupo 2 (río Pilatón).

Foto 12. Segunda sesión de trabajo, grupo 2 (río Pilatón). Presentación de resultados.

Anexo 1. Registro de participantes

Ministerio del Ambiente

Taller inicial formulación del proyecto para potenciar la resiliencia al cambio climático en la cuenca hídrica Toachi - Pilatón

Unión del Toachi, 15 de julio de 2016

CAF BANCO DE DESARROLLO DE AMÉRICA LATINA

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Ministerio del Ambiente

Taller inicial formulación del proyecto para potenciar la resiliencia al cambio climático en la cuenca hídrica Toachi - Pilatón

Unión del Toachi, 15 de julio de 2016

BANCO DE DESARROLLO DE AMÉRICA LATINA

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Ministerio del Ambiente

Taller inicial formulación del proyecto para potenciar la resiliencia al cambio climático en la cuenca hídrica Toachi - Pilatón

Unión del Toachi, 15 de julio de 2016

CAF BANCO DE DESARROLLO DE AMÉRICA LATINA

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Ministerio del Ambiente

Taller inicial formulación del proyecto para potenciar la resiliencia al cambio climático en la cuenca hídrica Toachi - Pilatón

Unión del Toachi, 15 de julio de 2016

CAF BANCO DE DESARROLLO DE AMÉRICA LATINA

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Ministerio del Ambiente

Taller inicial formulación del proyecto para potenciar la resiliencia al cambio climático en la cuenca hídrica Toachi - Pilatón

Unión del Toachi, 15 de julio de 2016

CAF BANCO DE DESARROLLO DE AMÉRICA LATINA

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Nancy Oña	Palo Quemado	Morador	Palo Quemado	0990472299	
Juan Carlos Jiménez	MEER	Analista Técnico	Quito		juan.jimenez@hoges.gob.ec

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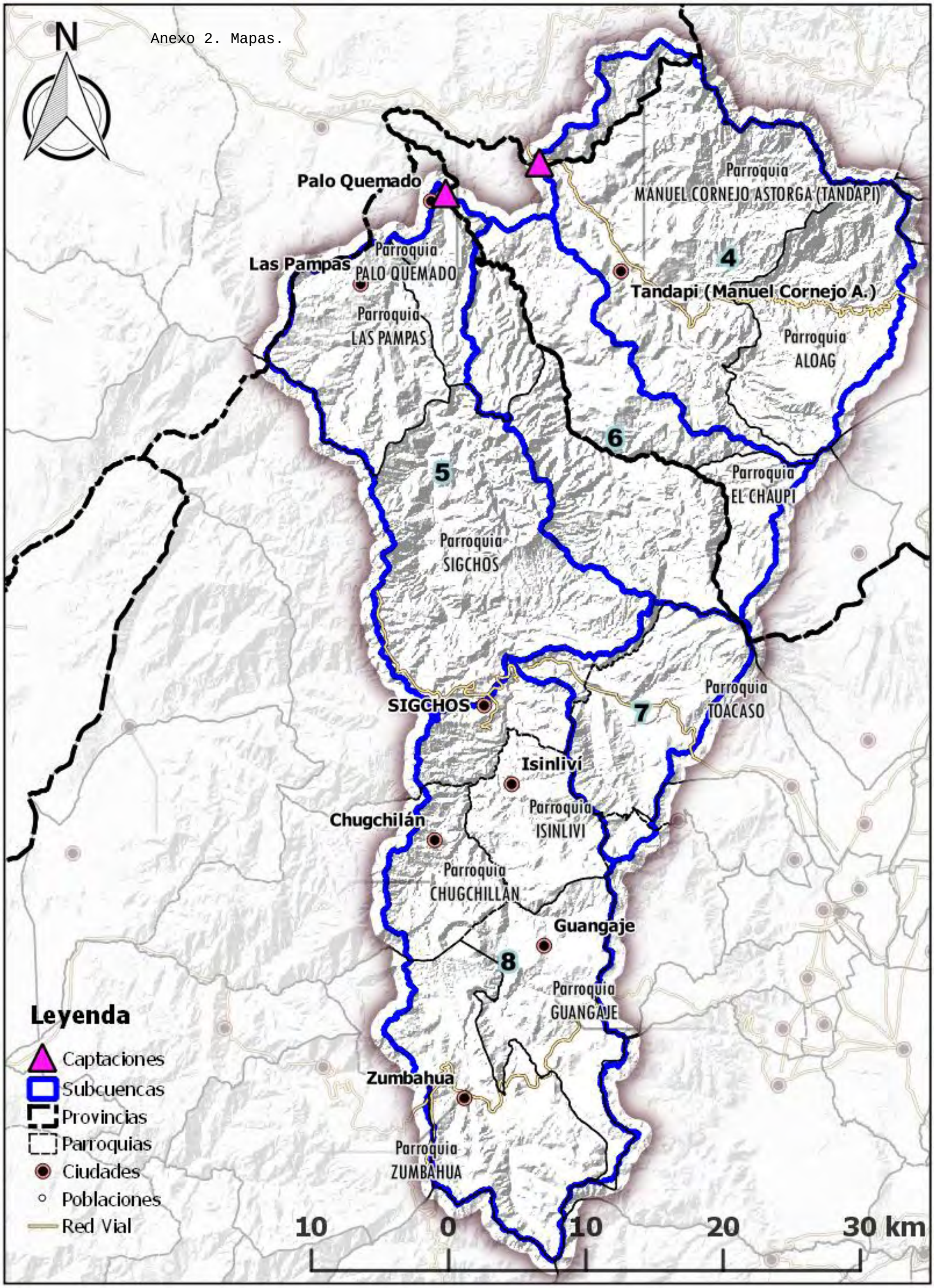
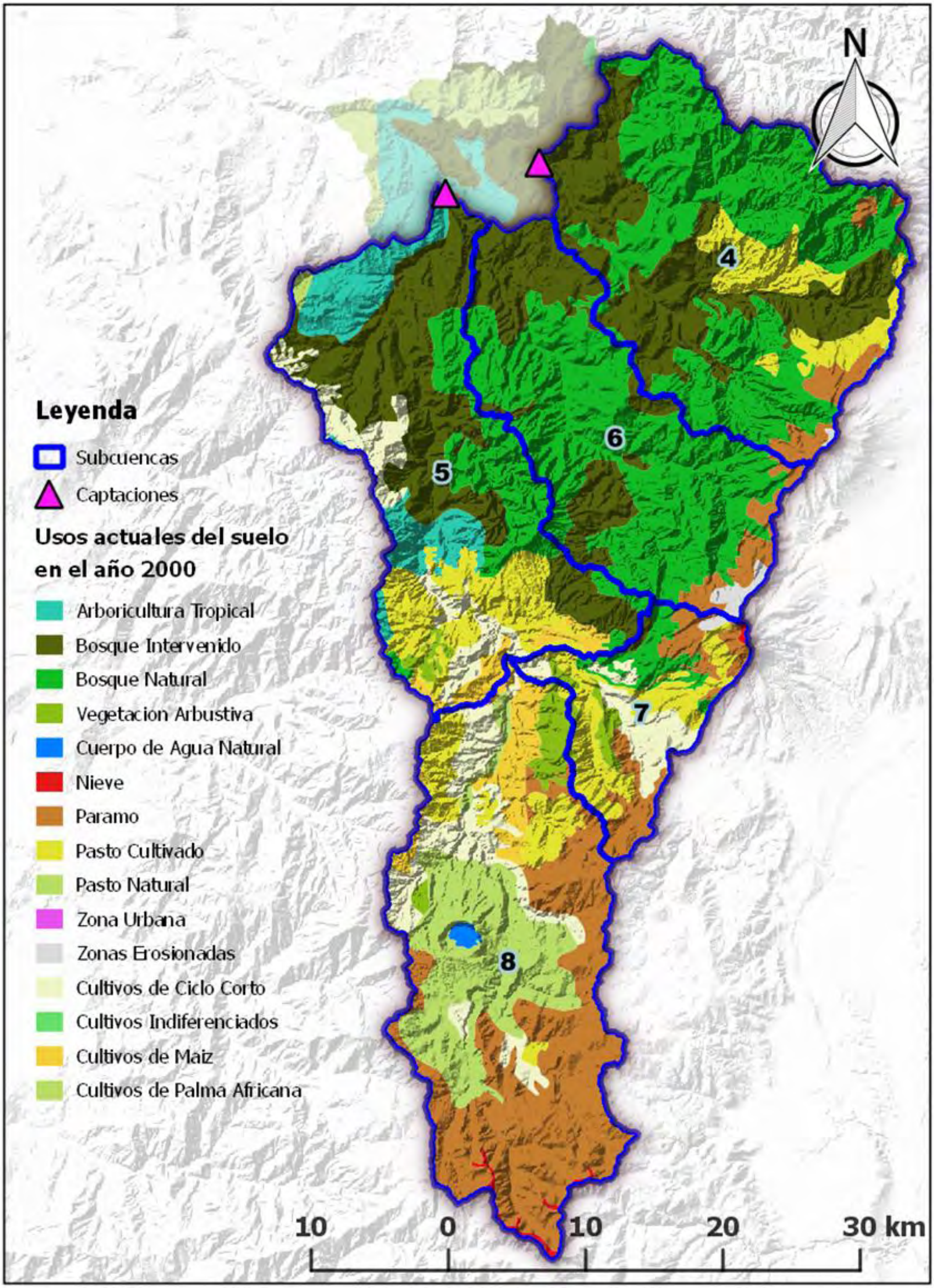
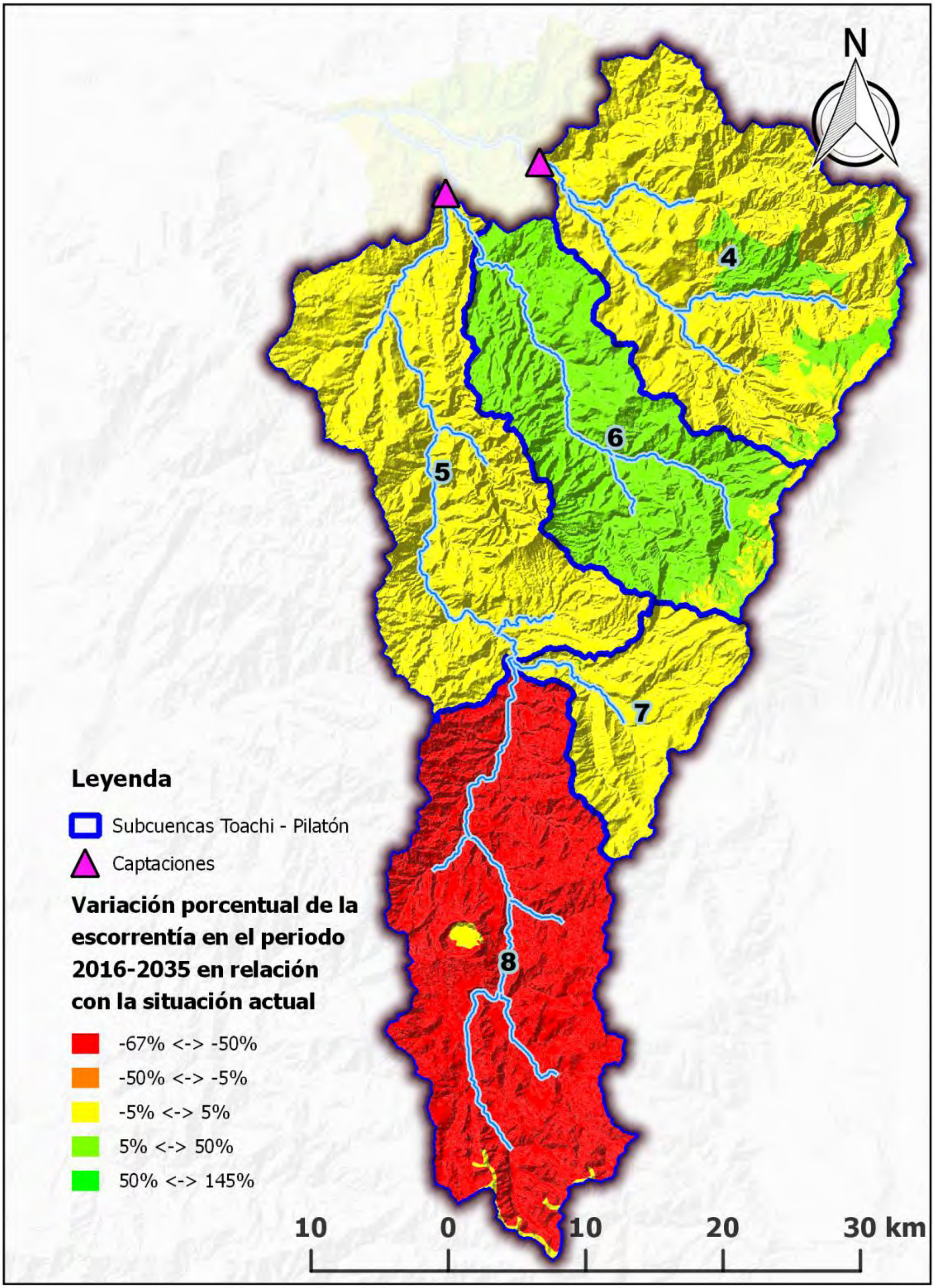


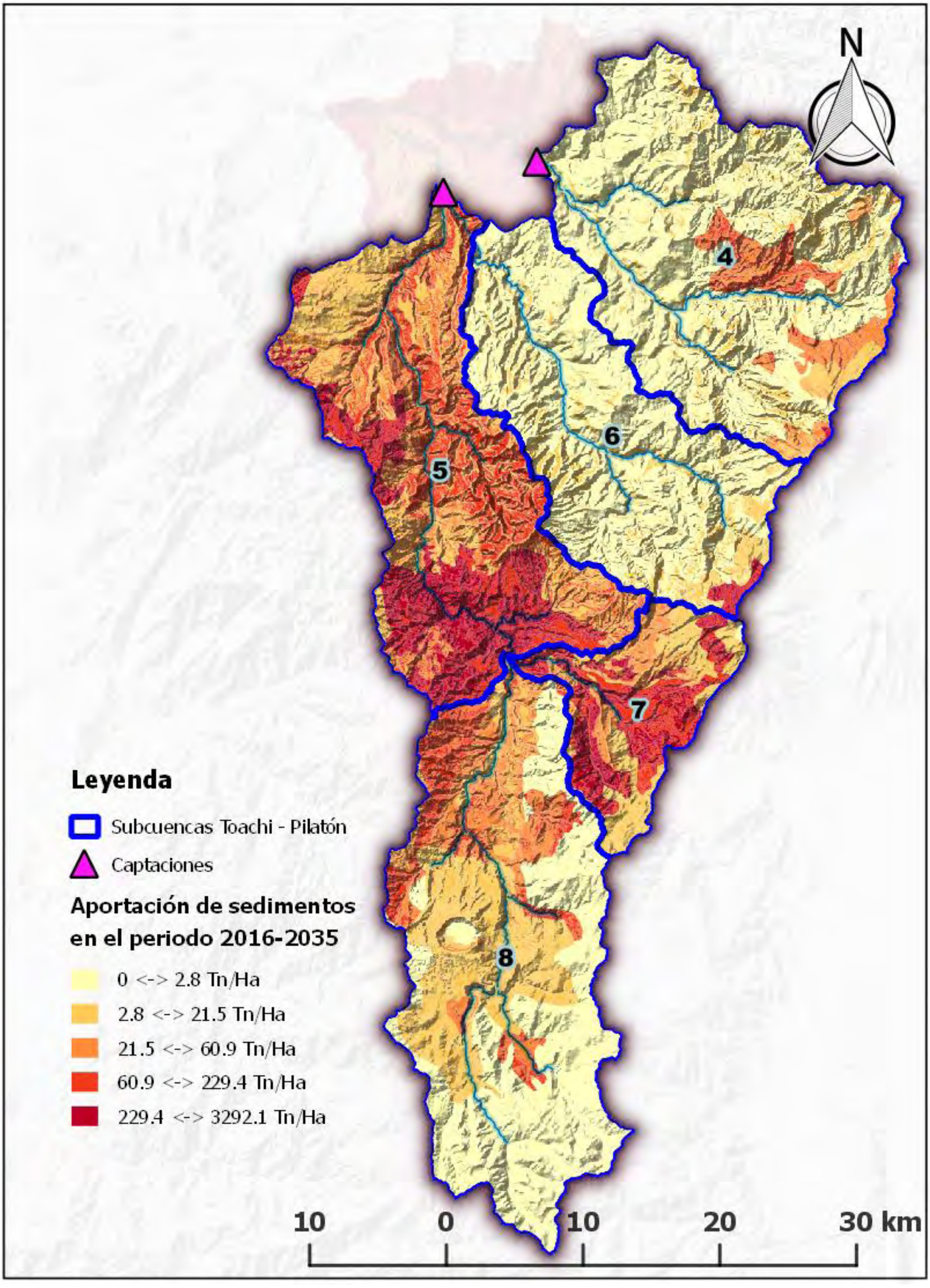
Mapa división político administrativo, con la red vial y con la ubicación de los núcleos urbanos dentro de las subcuencas aportantes de la Central Hidroeléctrica Toachi Pilatón



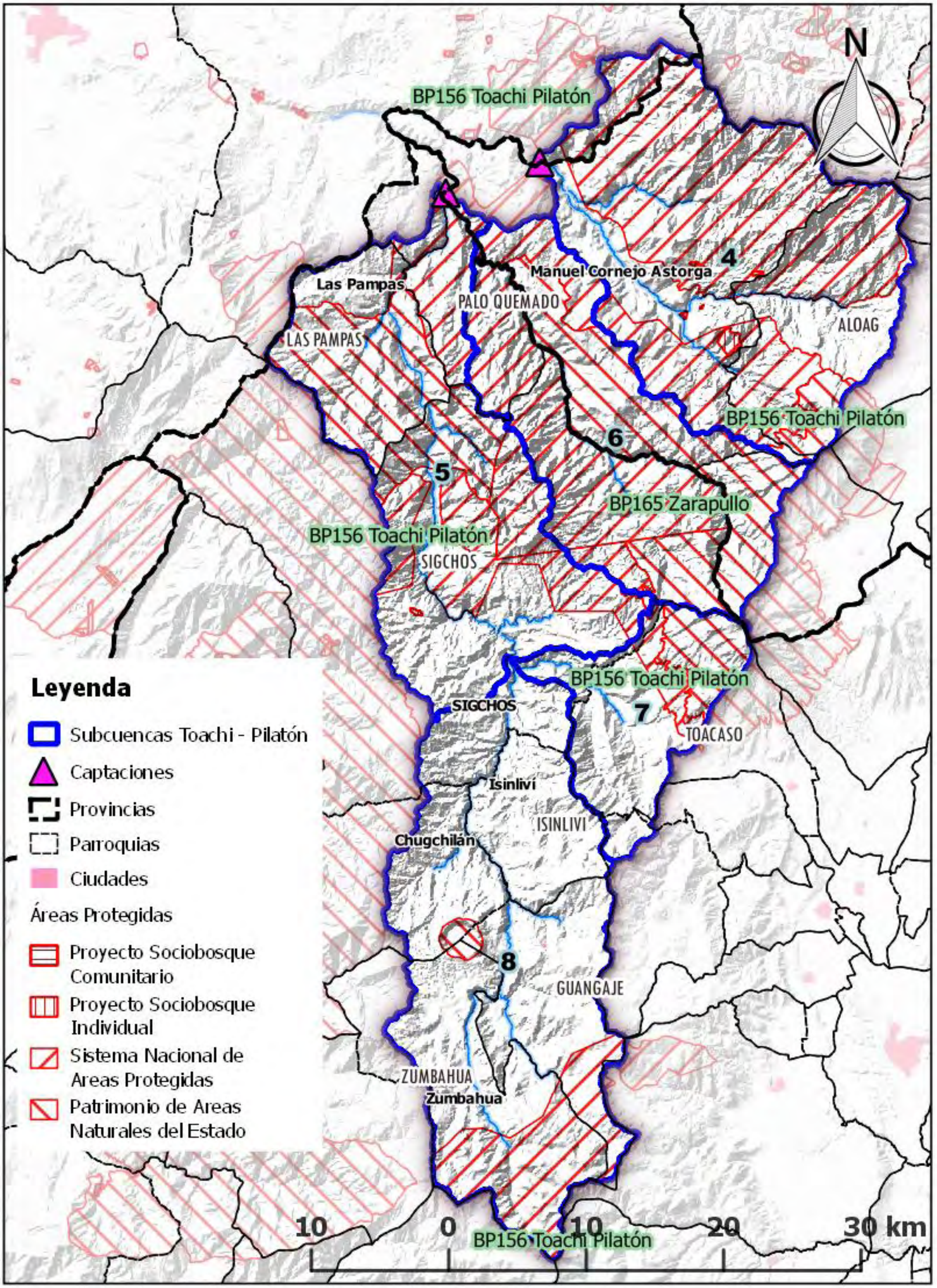
Usos actuales del suelo al año 2000 dentro de las subcuencas de los ríos Toachi y Pilatóns de la CH Toachi Pilatón.



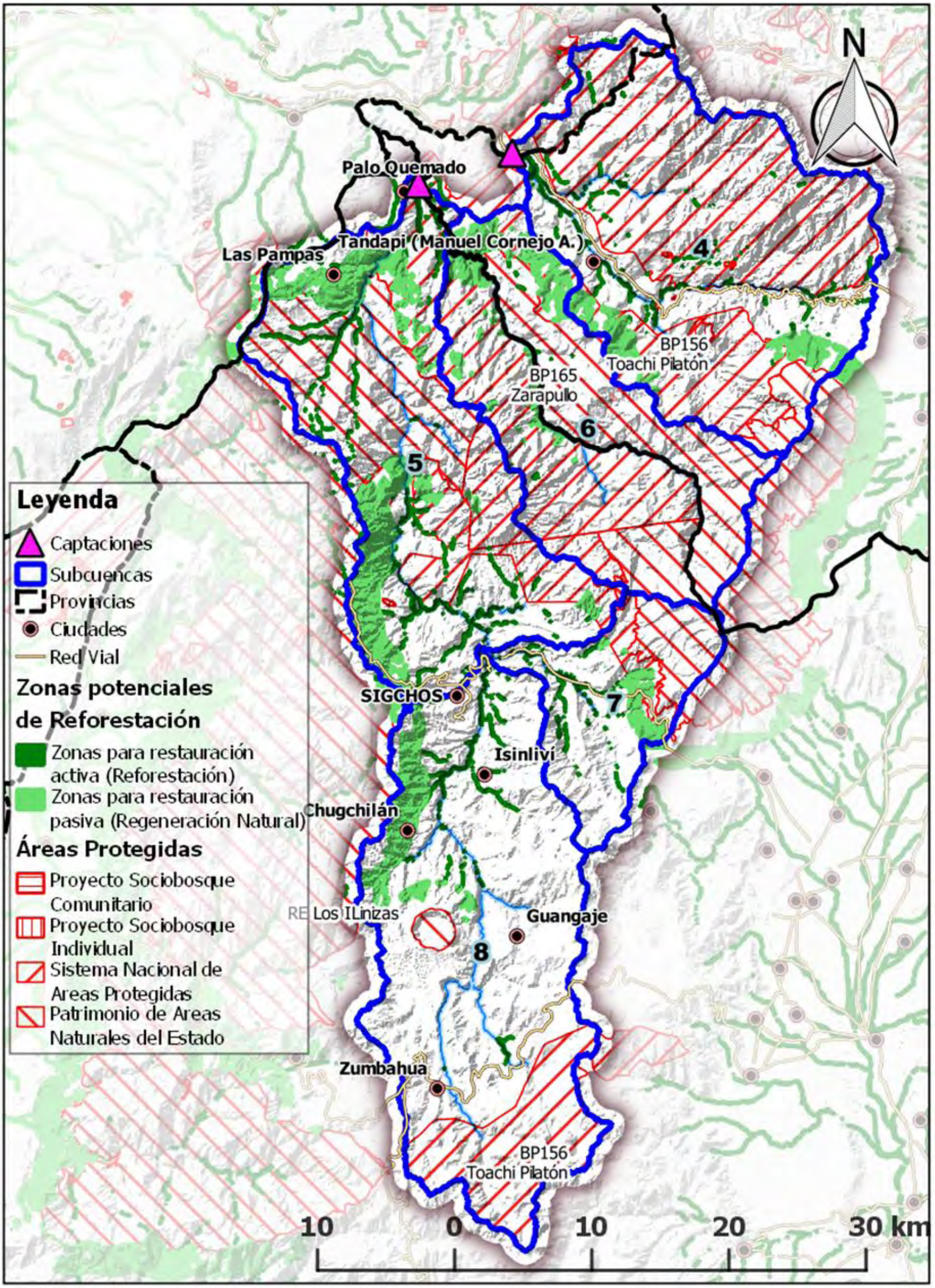
Variación porcentual de la escorrentía en el periodo 2016-2035 en relación con la situación actual, la unidad es en %.



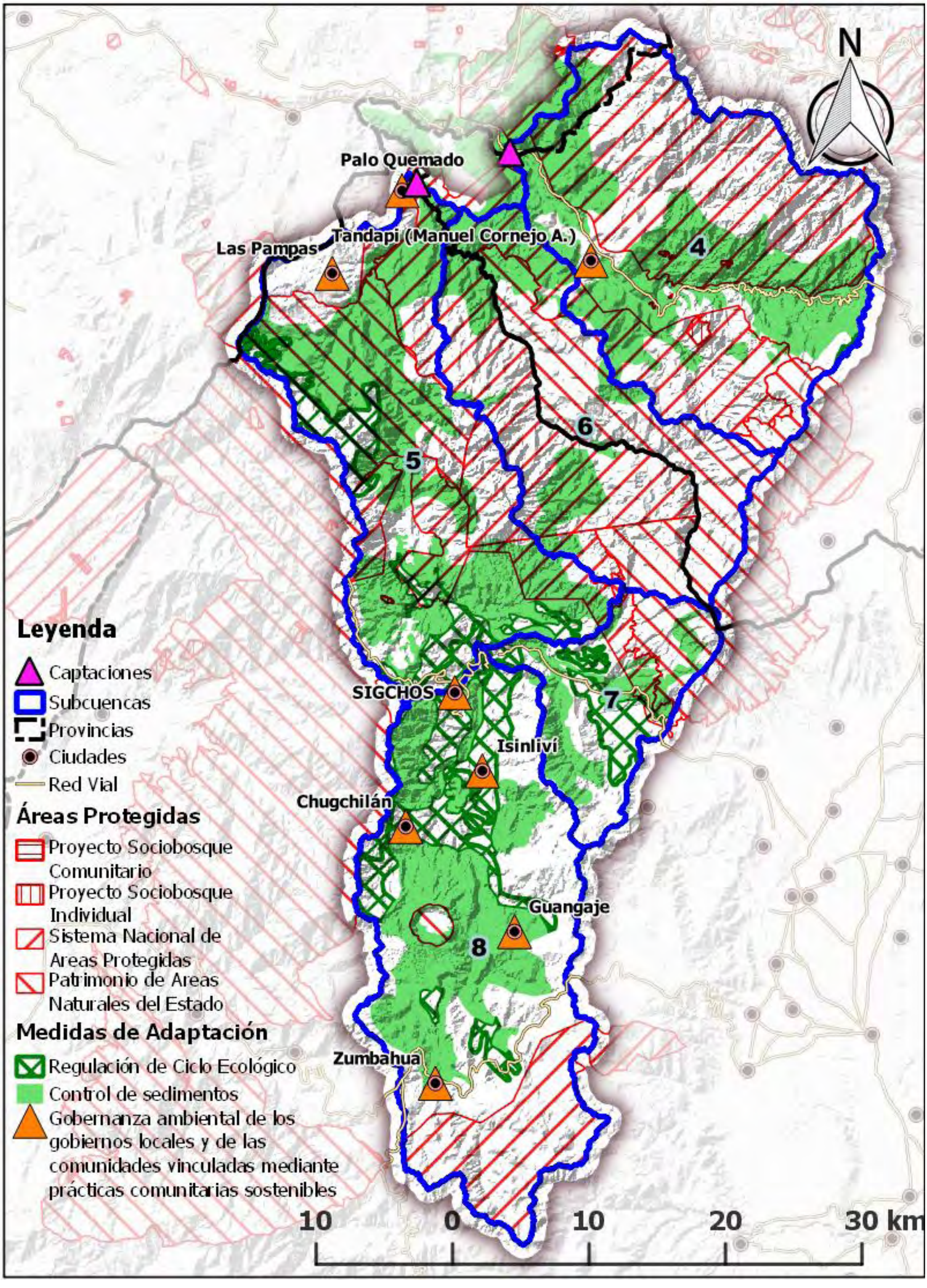
Aportación de sedimentos en el periodo 2016-2035, la unidad es ton/ha



Áreas protegidas, bosques protectores y Socio Bosque incluidos en las subcuencas Toachi y Pilatón



Ubicación de las Zonas de Reforestación Potencial para las subcuencas (río Toachi y río Pilatón), incluye áreas protegidas, centros poblados y subcuencas.



Medidas de Adaptación propuestas para las subcuencas de los ríos Toachi y Pilatón.

Anexo 3. Marco de resultados propuesto.

Objetivo Fortalecer la capacidad adaptativa de las poblaciones de la cuenca de los ríos Toachi y Pilatón ante los impactos del cambio climático.

Presupuesto solicitado USD2.400.000 / cuatro años

Componente	Resultados	Productos	Presupuesto referencial (USD)
1. Conservar la cobertura vegetal	1. Se conserva xxx ha de vegetación nativa y se reduce la carga de sedimentos (xxx t/año) para reducir el impacto del cambio climático en el ciclo hidrológico de la cuenca	1. Incorporar 1,000 ha de vegetación nativa bajo esquemas de conservación y manejo forestal sustentable	500,000
		2. Robustecer la gestión de XXX ha de bosques protectores y áreas de conservación existentes	275.000
		3. Construir XXX presas filtrantes para retención de sedimentos.	200.000
2. Adaptar las actividades productivas	2. XX% de la superficie cultivada incorpora prácticas de producción sustentable ajustadas a los posibles impactos del cambio climático	4. 125 ha de cultivos han adoptado prácticas sostenibles para adaptarse al cambio climático	1.000.000
3. Robustecer las capacidades locales y compartir experiencias	3. Población y gobiernos parroquiales con mayor capacidad para implementar medidas de adaptación al cambio climático	5. Ampliar la capacidad de monitoreo hidro-climático (4 estaciones hidrométricas y 3 estaciones meteorológicas) y de entrega de información a la comunidad.	200.000
		6. XXX planes parroquiales incorporan medidas de adaptación al cambio climático con perspectiva de cuenca hidrográfica.	75.000
		7. Plan de sensibilización y educación sobre adaptación al cambio climático implementado (XXX personas / XXX % población).	150.000

Agenda

08:30 h Registro de participantes

09:00 h Bienvenida

09:15 h Presentación de participantes

09:30 h Revisión de la agenda

09:45 h Introducción al cambio climático

10:00 h El Fondo de Adaptación

10:15 h Cambio climático en la cuenca Toachi – Pilatón

10:30 h Concepto de proyecto

11:00 h Trabajo en grupo. Análisis de situación

12:00 h Presentación de los grupos

13:00 h Almuerzo

14:00 h Trabajo en grupo. Acciones del proyecto

15:00 h Presentación de los grupos

16:00 h Próximos pasos

16:30 h Cierre

Notas

Dentro de subcuenca del río Blanco

Cantones Santo Domingo (Santo Domingo) Sigchos y Pujilí (Cotopaxi), Mejía (Pichincha)

Parroquias Aloag, Manuel Cornejo Astorga (Tandapi) [Pichincha], Alluriquin [Santo Domingo], Las Pampas, Palo quemado Sigchos [Cotopaxi]

Acelerada deforestación y cambio de uso de suelo

Incremento de sedimentos en los ríos

Pronóstico reducción 25% de pluviosidad

MAPA DE LOCALIZACIÓN DE ESTACIONES MATEOROLÓGICAS E HIDROLÓGICAS SUBCUENCA TOACHI - PILATÓN

700000 725000 750000 775000 800000

9950000 9925000 9900000

Santo Domingo de los Colorados
Alluriquin
Luz de America
Palo Quemado
Las Pampas
Manuel Cornejo
Lloa
Quito
Guangopolo
Conocoto
La Merced
Alangasi
Sangolqui
Cutuglahua
Amaguana
Cotogchoa
Pintag
Uyumbicho
Tambillo
Rumipamba
Aloag
Machachi
Aloasi
El Chaupi
San Juan de Pastocalle
Toacaso
Tanicuchi
Mulalo
Canchagua
Guaitacama
Jose Guango Bajo
Saquisili
Chantlin
Alaques
Poalo
11 de Noviembre
La Victoria
Latacunga
Pujili
Belisario Quevedo
Mulliquindil
San Miguel
Cochapamba
Guangaje
Isinlivi
Chugchillan
Guasaganda
Pucayacu
Sigchos
Tingo
Pilalo
La Mana
Zumbahua

H0188 H0155 H0160 H0166 H0164

M717 M362 M683 M719 M350 M718 M363 M529

Anexo 4. Ubicación de las estaciones meteorológica e hidrológicas de INAMHI

Esri, DeLorme, GEBCO, NOAA NGDC, and other contributors, Sources: Esri, GEBCO, NOAA, National Geographic, DeLorme, HERE, Geonames.org, and other contributors

Leyenda

- ESTACIONES METEOROLÓGICAS
- ESTACIONES HIDROLÍGICAS OPERATIVAS 2016
- ESTACIONES HIDROLÓGICAS NO OPERATIVAS 2016
- VIAS_MOP_WGS84
- RIOS
- RÍOS
- SUBCUENCA TOACHI
- SUBCUENCA PILATÓN

N W E S

Ubicación en el Ecuador

REPÚBLICA DEL ECUADOR

Secretaría Nacional de Gestión de Riesgos
Instituto Nacional de Meteorología e Hidrología

Mapa de localización de estaciones Meteorológicas e Hidrológicas Subcuenca Toachi - Pilatón

Fuente:
Mapa Base: I.G.M, SGR, INAMHI (Escala 1:50.000)

SISTEMA DE COORDENADAS:
UTM. Elipsoide Internacional Datum Horizontal WGS84 (World Geodetic System) Zona 17S

1:373.121

0 2,75 5,5 11 16,5 22 Km

INAMHI	Formato de impresión:	Mapa:
Dirección de Hidrología	DIN A3	No_1

Preliminary Environmental and Social Risks Analysis Matrix for Infrastructure, Social Development and Environmental Projects

Annex 6. CAF´s preliminary environmental and social risk analysis matrix

Name of the Project	Increasing adaptive capacity of local communities, ecosystems and hydroelectric systems in the Toachi – Pilatón watershed with a focus on Ecosystem and Community Based Adaptation and Integrated Adaptive Watershed Management
Country	Ecuador
Client	Ministry of Environment of Ecuador. Donor: Adaptation Fund
Date	July 2016
Environmental Executive	Carolina Cortés
Project Category	1C - ☐ Category II Moderate risk (3a, 2b, 1c)

Project Type (PT)

Type of Project	Characteristics
Type a	Those that by their dimensions and components are known that can generate multiple and complex environmental and social impacts.
Type b	Those medium impacts, however, can significantly affect some features of the natural, social, economic or cultural environment.
Type c	Those with low or negative environmental and social impacts, which generally include planning programs and social and institutional improvement, which usually do not include infrastructure.

Type a		Project (*)
Electric Energy	- Plants hydroelectric power generation (large-scale) - Plants thermoelectric power generation - Plants nuclear power generation	
Water y Sanitation	- Dams and reservoirs for drinking water - Use of watersheds - Transfer of basins - Macro drains	
Transport	Construction and / or opening, reconstruction: - Primary Roads - Secondary roads - Rural roads and / or tertiary - Railways and underground - International and domestic airports - Sea and river ports - Major urban roads	

Preliminary Environmental and Social Risks Analysis Matrix for Infrastructure, Social Development and Environmental Projects

Agriculture y Fishing	- Irrigation and drainage (large scale) - Aquaculture and ocean-culture (large scale) - Expansion and agricultural development - Forestry - Agro-industrial scale projects (e.g. industrial plantations for biofuel)	
Environmental	- Facilities for handling solid waste and / or hazardous - Forestry production	
Hydrocarbons	- Exploration - Production - Pipelines - Refining	
Mining	- All	
Other	Specify	
Type b		
Electric Energy	- Electric power transmission / Rural Electrification - Small hydroelectric power plants (PCH) - Use of alternative energies (wind , biomass)	
Water y Sanitation	- Treatment Plants drinking water and / or wastewater - Transmission and distribution of drinking water - Public Sewer	
Transport	Rehabilitation / Maintenance : - Secondary roads - Rural roads and / or tertiary - Urban Roads	
Agriculture y Fishing	- Irrigation and drainage (small scale) - Aquaculture and ocean-culture (small scale)	
Environmental	- Facilities for the recycling of solid waste	
Hydrocarbons	- Distribution of domestic gas	
Other	- Ecotourism infrastructure - Industrial Restructuring - Expansion projects , operation and maintenance of category "A " - Projects involving significant generation of electromagnetic fields	
Type c		
Electric Energy	- Commercial distribution of electricity - Photovoltaic Parks	
Telecommunications	- Projects involving the use of optical fiber and minimal generation of electromagnetic fields	
Health	- Health Programs - Health infrastructure (hospitals)	
Education	- Education Programs - Infrastructure in Education (schools)	
Environmental	- Integrated Watershed Management - Comprehensive Management of Protected Areas - Restoration of degraded natural areas	X

Other	- Institutional Development - Technical assistance - Ecotourism no infrastructure - Risk management infrastructure: [1] Alluvial Energy Dissipation and mudflow containment systems in Antofagasta / [2] Retaining wall / Slope stabilization in Esmeraldas.	

(*) Mark the appropriate

Meanwhile, the CS may be divided into three grades:

Context Sensitivity (CS)

Context Sensitivity	Characteristics
High Sensitivity (1)	It corresponds to an environment in which certain physical, natural, economic, social and cultural characteristics, their level of fragility or vulnerability, enhance the level of involvement of the intervention. The mere presence of one of the variables considered high sensitivity is crucial and overrides the other classified as moderate or low sensitivity.
Moderate Sensitivity (2)	It corresponds to an environment where the nature or extent of current intervention of the physical, natural, economic, social and cultural environment , determine a lower level of involvement by the intervention , to the extent that the values that may be lost are lower with respect to an ecosystem without intervention.
Low Sensitivity (3)	It corresponds to an environment where the characteristics or degree of actual physical intervention , natural, economic , social and cultural environment, determined little to no level of involvement by the intervention.

High Sensitivity (1)		Project (*)
Physical component	- Mountain area with rugged terrain (> 35 % slope) - Areas of high seismic activity - Areas highly vulnerable to El Niño / La Niña and extreme weather events - Areas under the influence of volcanic activity - High potential for erosion - Rising water or water bodies of environmental and social strategic importance	X
Biological component	- Wetlands and / or mangroves, permanently flooded areas, corals - Primary or secondary forest mature - Exceptional Ecosystems - Presence of local or regional protected areas - Presence of threatened or endangered	X
Social, Economic and Cultural component	- Sites of archaeological and anthropological - Areas with armed conflicts or conflicts over the use of natural resources - Urban settlements with low levels of social equipment - Areas subject to resettlement population (> 20 people) - Areas with incompatible uses for the purposes of the project - Use wooden or products from natural forests primary or secondary - High water consumption in areas of low abundance or intensive - High power consumption in areas of low abundance or intensive - High production of discharges, emissions and / or solid waste - Areas or settlements with high levels of Unsatisfied Basic Needs - Areas with presence of indigenous communities - Areas with high tourist value	X

Referencia: Procedimiento para la Evaluación y Seguimiento Ambiental y Social de Operaciones de Infraestructura, Desarrollo Ambiental y Social
FR / DACC – 086

Preliminary Environmental and Social Risks Analysis Matrix for Infrastructure, Social Development and Environmental Projects

Moderate Sensitivity (2)		
Physical component	- Undulating land (15-35 % slope) - Moderate earthquake risk - Moderate potential for erosion - Sporadically flooded areas	
Biological component	- Young secondary forests or in succession	
Social, Economic and Cultural component	- Urban settlements with moderate levels of social equipment - Areas of uses not defined - Areas subject to resettlement population (<20 people) - Use or wood products from planted forests. - Moderate consumption of water in areas of low abundance or heavy use - Moderate energy consumption in areas of low abundance or heavy use - Areas or settlements with high levels of Unsatisfied Basic Needs	
Low Sensitivity (3)		
Physical component	- Land undulating planes (< 15 % slope) - Areas without flooding	
Biological component	- Herbaceous vegetation operated and / or wide geographical distribution	
Social, Economic and Cultural component	- Urban settlements with high levels of social equipment - Areas with low levels of social conflict - Areas with alternative uses or consonant to the purposes of the project - Low water consumption in areas of low abundance or heavy use - Low power consumption in areas of low abundance or heavy use	

(*)Mark the appropriate

Resume

Name of the Project	PT	CS
Increasing adaptive capacity of local communities, ecosystems and hydroelectric systems in the Toachi – Pilatón watershed with a focus on Ecosystem and Community Based Adaptation and Integrated Adaptive Watershed Management	**Type C**	**1**

The project focuses on key drivers that will worsen the probable impact from climate change. The expected mid-term impacts are improved enabling conditions to sustain forest cover and sustainable small-scale farming in the area. In the long-term, it is expected that this will result in improved adaptive capacity. It is also envisioned that the lessons of the project are useful to other parts of Ecuador and other Andean countries.

Component 1 will focus on the conservation of forests. Three outcomes will be generated by (i) expanding protection of existing forests under mechanisms of conservation and sustainable forest

management7, (ii) strengthening the management of existing protected forests and private reserves, and (iii) to build artisanal sediment retention dams8 in key risk areas.

Component 2 will focus on introducing sustainable farming practices to reduce the impact on the local water cycle and to adapt to probable conditions of reduced rainfall. One outcome will be generated by introducing best practices in about 250 ha of pasture land and 200 ha of crops (including sugarcane).

Component 3 will focus on strengthening private and public local capacities to implement adaptation measures. Three outcomes will be generated by (i) strengthening climate-monitoring, (ii) introducing adaptation to climate change into parish development and land use plans, and (iii) implementing public communication and education plans. It is foreseen that this component will facilitate dialogue and collaboration among stakeholders to strengthen social capital.

Matrix Preliminary Analysis of Environmental and Social Risk

Category of the Project				Associated Risk
TO / SM	a	b	c	
1	1a	1b	1c	■ Category I High risk (1a,1b, 2a) ■ Category II Moderate risk (3a, 2b, 1c) ■ Category III Low Risk (3b, 2c, 3c)
2	2a	2b	2c	
3	3a	3b	3c	

Assigned Category: 1C - ☐ Category II Moderate risk (3a, 2b, 1c)

Annex 7. Screening matrix to verify compliance with the Adaptation Fund´s Environmental and Social Policy.

Environmental and social principles that always apply.

Risks identified.

Risk level: low, medium high

Environmental and social principles[1]	Project outputs			
	1. 1000 ha of native vegetation is conserved by sustainable forest management and conservation mechanisms	2. Improved management of existing protected forests and private conservation areas (ca., 230,000 ha)	3. Five artisanal sediment retention dams.	4. 250 ha of pasture and 250 ha of crops apply sustainable farming practices.
1. Compliance with the Law	No risk. This is privately owned land that voluntarily apply to receive an economic incentive to conserve forest cover. The Socio Bosque incentive is regulated by several Ministerial Agreements[2]	No risk. The existing protected forests are regulated under the forestry law. The private conservation areas are recognised under the Ecuadorian law.	Requires environmental permit. Risk (low): Inadequate implementation of mandatory environmental and social management measures required by the national authority and CAF.	No risk. These are private farmland.

[1] As listed in section B of the Environmental and Social Policy (AF, 2013).

[2] Ministerial Agreement 169 of 2008 that creates Socio Bosque, Ministerial Agreement 130 of 2012 that establish the operation manual for Socio Bosque, Ministerial Agreement 114 of 2013 that established the national policy for governance of the nation´s natural patrimony, and Ministerial Agreement 131 of 2013 that creates the national programme of incentives Socio Bosque.

Environmental and social principles[1]	Project outputs			
	1. 1000 ha of native vegetation is conserved by sustainable forest management and conservation mechanisms	2. Improved management of existing protected forests and private conservation areas (ca., 230,000 ha)	3. Five artisanal sediment retention dams.	4. 250 ha of pasture and 250 ha of crops apply sustainable farming practices.
2. Access and equity	Risk (low): local land owners not adequately informed of the proposed use of economic incentives (Socio Bosque). If not adequately informed, the local land owners may believe that the project will affect their land rights.	No risk. The protected forests are state property. The proposed actions do not impede access to basic health services, clean water and sanitation, energy, education, housing, safe and decent working conditions, and land rights of local groups.	No risk. The artisanal dams will not impede access to basic health services, clean water and sanitation, energy, education, housing, safe and decent working conditions, and land rights of local groups. They will be managed by the parrish governments.	No risk. The project intervention will occur in farms chosen by the farmers' organizations. The demonstration plots will be open to all local farmers.
3. Marginalized and vulnerable groups	No risk. The project actions will not negatively affect marginalized and vulnerable groups.	No risk. The project actions will not negatively affect marginalized and vulnerable groups.	No risk. The project actions will not negatively affect marginalized and vulnerable groups.	No risk. The project actions will not negatively affect marginalized and vulnerable groups.
4. Human rights	No specific issues concerning human rights were identified that could be exacerbated by the project intervention.	No specific issues concerning human rights were identified that could be exacerbated by the project intervention.	No specific issues concerning human rights were identified that could be exacerbated by the project intervention.	No specific issues concerning human rights were identified that could be exacerbated by the project intervention.
5. Gender equity and women´s empowerment	Risk (low). Women with increased work load. No specific factors will impede or limit women´s participation. However, some farmers are opting for paid employment in Santo Domingo. This increases the responsibility of	Risk (low). Women with increased work load. No specific factors will impede or limit women´s participation. However, some farmers are opting for paid employment in Santo Domingo. This increases the responsibility of	No specific factors will impede or limit women´s participation.	Risk (low). Women with increased work load. No specific factors will impede or limit women´s participation. However, some farmers are opting for paid employment in Santo Domingo. This increases the responsibility of

Environmental and social principles[1]	Project outputs			
	1. 1000 ha of native vegetation is conserved by sustainable forest management and conservation mechanisms	2. Improved management of existing protected forests and private conservation areas (ca., 230,000 ha)	3. Five artisanal sediment retention dams.	4. 250 ha of pasture and 250 ha of crops apply sustainable farming practices.
	tending the farm and rural property to women and other family members.	tending the farm and rural property to women and other family members.		tending the farm and rural property to women and other family members.
6. Core labour rights	The project intervention has no implication with the four fundamental principles and rights at work.	The project intervention has no implication with the four fundamental principles and rights at work.	The project intervention has no implication with the four fundamental principles and rights at work.	The project intervention has no implication with the four fundamental principles and rights at work.
7. Indigenous peoples	The areas of intervention will not affect indigenous groups or territories	The areas of intervention will not affect indigenous groups or territories	The project actions will not affect indigenous groups or territories.	The areas of intervention will not affect indigenous groups or territories
8. Involuntary resettlement	The project intervention does not imply displacement of local population. The economic incentives will be given to rightful landowners.	The project intervention does not imply displacement of local population. The protected forests are State property and the private conservation areas are private property.	The project intervention does not imply displacement of local population.	The project intervention does not imply displacement of local population. The farms are private land.
9. Protection of natural habitats	The project intervention does not involve unjustified conversion or degradation of critical natural habitats. On the contrary, project actions will motivate the conservation of existing vegetation cover.	The project intervention does not involve unjustified conversion or degradation of critical natural habitats. On the contrary, project actions will motivate the conservation of existing vegetation cover.	The project intervention will not intervene areas with high value biodiversity.	The project intervention will not intervene areas with high value biodiversity. Project actions will occur in existing farmland.

Environmental and social principles[1]	Project outputs			
	1. 1000 ha of native vegetation is conserved by sustainable forest management and conservation mechanisms	2. Improved management of existing protected forests and private conservation areas (ca., 230,000 ha)	3. Five artisanal sediment retention dams.	4. 250 ha of pasture and 250 ha of crops apply sustainable farming practices.
10. Conservation of biological diversity	The project intervention does not involve unjustified reduction or loss of biological diversity or the introduction of known invasive species. On the contrary, project actions will motivate the conservation of existing vegetation cover.	The project intervention does not involve unjustified reduction or loss of biological diversity or the introduction of known invasive species. On the contrary, project actions will motivate the conservation of existing vegetation cover.	The project intervention will not intervene areas with high value biodiversity.	The project intervention will not intervene areas with high value biodiversity. Project actions will occur in existing farmland and will improve farming practices of existing crops.
11. Climate change	No risk. The project intervention does not include activities with large greenhouse emissions.	No risk. The project intervention does not include activities with large greenhouse emissions.	No risk. The project intervention does not include activities with large greenhouse emissions.	No risk. The project intervention does not include activities with large greenhouse emissions.
12. Pollution prevention and resource efficiency	The project intervention will not use large quantities of energy, water or other natural resources. Nor produce wastes or release pollutants.	The project intervention will not use large quantities of energy, water or other natural resources. Nor produce wastes or release pollutants.	Risk (low). Pollution generated during construction works.	The project intervention will not use large quantities of energy, water or other natural resources. Nor produce wastes or release pollutants.
13. Public health	The project intervention does not imply negative impacts on public health.	The project intervention does not imply negative impacts on public health.	The project intervention does not imply negative impacts on public health.	The project intervention does not imply negative impacts on public health.

Environmental and social principles[1]	Project outputs			
	1. 1000 ha of native vegetation is conserved by sustainable forest management and conservation mechanisms	2. Improved management of existing protected forests and private conservation areas (ca., 230,000 ha)	3. Five artisanal sediment retention dams.	4. 250 ha of pasture and 250 ha of crops apply sustainable farming practices.
14. Physical and Cultural Heritage	The project intervention will not affect or intervene physical and cultural heritage.	The project intervention will not affect or intervene physical and cultural heritage.	The project intervention will not affect or intervene physical and cultural heritage.	The project intervention will not affect or intervene physical and cultural heritage.
15. Lands and Soil Conservation	The project intervention will not negatively affect valuable land. On the contrary, project actions will contribute to soil conservation.	The project intervention will not negatively affect valuable land. On the contrary, project actions will contribute to soil conservation.	The project intervention will not intervene valuable land.	The project intervention will not negatively affect valuable land. On the contrary, project actions will contribute to soil conservation.

Environmental and social principles	Project outputs		
	5. Improved monitoring stations (3 meteorological and 4 hydrometric) provide prompt and reliable information to the local population and relevant authorities	6. Six development plan incorporate measures for climate change adaptation with a watershed perspective.	7. Public communication and education plan implemented in the lower basin (ca., 13,000 people).
1. Compliance with the Law	No risk. The stations will be managed by the national authority (INAMHI).	No risk. Updating the plans is within the faculties of the parrish goverments	No risk. There are no legal requirements to comply.

Environmental and social principles	Project outputs		
	5. Improved monitoring stations (3 meteorological and 4 hydrometric) provide prompt and reliable information to the local population and relevant authorities	6. Six development plan incorporate measures for climate change adaptation with a watershed perspective.	7. Public communication and education plan implemented in the lower basin (ca., 13,000 people).
2. Access and equity	No risk. The benefits from the project intervention (i.e., meteorological and hydrological information) will serve all the population.	Risk (low): Local population not adequately informed about the changes in the local development plans.	Risk (low): Local population not adequately aware of climate-related risks (communication channels insufficient to address the intended audience)
3. Marginalized and vulnerable groups	No risk. The project actions will not negatively affect marginalized and vulnerable groups.	No risk. The project actions will not negatively affect marginalized and vulnerable groups.	No risk. The project actions will not negatively affect marginalized and vulnerable groups.
4. Human rights	No specific issues concerning human rights were identified that could be exacerbated by the project intervention.	No specific issues concerning human rights were identified that could be exacerbated by the project intervention.	No specific issues concerning human rights were identified that could be exacerbated by the project intervention.
5. Gender equity and women´s empowerment	No specific factors will impede or limit women´s participation. The information generated will serve all the populaton.	Risk (low): The adaptation measures are not gender and age sensitive and do not consider the needs of persons with disabilities.	Risk (low): the communication channels and messages are not gender and age sensitive and do not consider the needs of persons with disabilities.
6. Core labour rights	The project intervention has no implication with the four fundamental principles and rights at work.	The project intervention has no implication with the four fundamental principles and rights at work.	The project intervention has no implication with the four fundamental principles and rights at work.
7. Indigenous peoples	The project actions will not affect indigenous groups or territories.	The project actions will not affect indigenous groups or territories.	The project actions will not affect indigenous groups or territories.
8. Involuntary resettlement	The project intervention does not imply displacement of local population.	The project intervention does not imply displacement of local population.	The project intervention does not imply displacement of local population.
9. Protection of natural habitats	The project intervention will not intervene in protected areas or high value conservation areas.	Risk (low). Do not consider the role of natural habitats in the climate change adaptation measures to be included in the local development plans.	The project intervention will not intervene in protected areas or high value conservation areas.

Environmental and social principles	Project outputs		
	5. Improved monitoring stations (3 meteorological and 4 hydrometric) provide prompt and reliable information to the local population and relevant authorities	6. Six development plan incorporate measures for climate change adaptation with a watershed perspective.	7. Public communication and education plan implemented in the lower basin (ca., 13,000 people).
10. Conservation of biological diversity	The project intervention will not intervene areas with high value biodiversity. The stations will be located in intervened areas.	The project intervention does not involve unjustified reduction or loss of biological diversity or the introduction of known invasive species. On the contrary, project actions will motivate the conservation of existing vegetation cover.	The project intervention does not involve unjustified reduction or loss of biological diversity or the introduction of known invasive species. On the contrary, project actions will motivate the conservation of existing vegetation cover.
11. Climate change	No risk. The project intervention does not include activities with large greenhouse emissions.	No risk. The project intervention does not include activities with large greenhouse emissions.	No risk. The project intervention does not include activities with large greenhouse emissions.
12. Pollution prevention and resource efficiency	The project intervention will not use large quantities of energy, water or other natural resources.	The project intervention will not use large quantities of energy, water or other natural resources.	The project intervention will not use large quantities of energy, water or other natural resources.
13. Public health	The project intervention does not imply negative impacts on public health.	The project intervention does not imply negative impacts on public health.	The project intervention does not imply negative impacts on public health.
14. Physical and Cultural Heritage	The project intervention will not affect or intervene physical and cultural heritage.	The project intervention will not affect or intervene physical and cultural heritage.	The project intervention will not affect or intervene physical and cultural heritage.
15. Lands and Soil Conservation	The project intervention will not intervene valuable land.	The project intervention will not intervene valuable land.	The project intervention will not intervene valuable land.

STAKEHOLDERS, INTERESTS AND SOCIOECONOMIC SITUATION IN THE TOACHI-PILATÒN WATERSHEDS

CONTENT

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STAKEHOLDERS, INTERESTS AND SOCIOECONOMIC SITUATION IN THE TOACHI-PILATÒN WATERSHEDS

Byron Real[1]

Introduction

A watershed is an "area of land that drains all the streams and rainfall to a common outlet such as the outflow of a reservoir, mouth of a bay, or any point along a stream channel" (USGS 2016). Besides of being such natural framework watersheds are also areas of intense socioeconomic exchange where people and organizations of diverse type and range (state, natural resources extractors, traders, farmers and so on) exert their agency in order to get and influence management of the existent resources in the area.

Because of the diversity of existing geographic areas, the often difficult access to them, and the social competition for its natural resources, watershed s are of complex management and then prone to be ecologically neglected and significantly altered by socioeconomic activities. Since whatever natural and human-induced issues happening in upper areas can affect the rest of the basin until the river-outflow point, watersheds are extremely vulnerable to socioeconomic activities. For that it is important to apply integrated water management strategies where all stakeholders can coordinate and exchange experiences, and be regulated and controlled in a comprehensive plan intended to protect the hydric resources.

The ecological vulnerability of the watershed supposes also a socioeconomic vulnerability of the societies living in these areas especially those already vulnerable like women, children and indigenous people. By historical and socioeconomic issues these groups are the most vulnerable in any society and particularly in those of frontier where social life depends of direct natural resource extraction. In this understanding the climate change phenomenon and the expected impacts on nature and society will particularly affect watersheds and women and indigenous people as the most vulnerable in natural and social environments. Therefore in the efforts to promote adaptation measures to address the problem of climate change especial attention must be devoted to watersheds, its societies, and the women, children and indigenous peoples existing in these environments.

Considering the issues of social and natural vulnerability and the expected effects of climate change, this document presents a quick ecological and socioeconomic overview of the Toachi and Pilaton watersheds pointing the situation of the three rural jurisdictions in which lie the critical part of this area and identifying stakeholders and their perceptions regarding weather and climate change issues. As part of this analysis this document also points the situation of women and issues of gender inequality in this area.

The Toachi and Pilaton watersheds located in the North-Central area of Ecuador, in the so-called Cordillera Occidental de los Andes, in the provinces of Cotopaxi, Pichincha

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and Santo Domingo de los Tsachilas. Starting both watersheds in different volcano systems at more than 14,000 feet over the sea level in the Cotopaxi province; they joint at 2,000 feet altitude in the Santo Domingo de los Tsachilas province and then under the name of Blanco River run northbound to then be part of the Esmeraldas basin, which finally drains its waters in the Pacific Ocean. Besides, because of the elevated altitude and topographic steepness of ridges and hills of the cordillera where the basin starts, the Toachi and Pilaton rivers are the outflow point of several smaller watersheds which increase the ecological complexity of this area.

The analysis and conclusions of this document intend to put in perspective the ecological and social complexity of the Toachi-Pilaton watershed and the imperative to address both in the efforts to promote adaptation measures to deal with the expected issues related with climate change events.

NATURAL SCENE OF THE AREA

The Toachi river starts in the foothills of the Chugchilán mountains, a branch of the Western Cordillera, in territories of the Chugchilán and Isinliví parishes, in the county of Sigchos, province of Cotopaxi. The river begins at an altitude of 4500 m and descends to 1000 m altitude to join the Pilaton River. The Toachi basin is flanked to the east by the Corazon hill (4,788 m s.n.m) and the volcanoes Illiniza Sur (5 248 m s.n.m.) and Illiniza Norte (5,126 m s.m.). To the South by the Era Urco hill (4,473 ms s.n.m.). These elevations contain several smaller water courses that end in the river Toachi. The basin of this river has a length of 104 km, and a contribution area of 1,478 km2.The average slope is of 34.7%.

The Pilatón river is formed by the thawing of the volcanoes glaciers of the Corazón (4,790 msnm) and Atacazo (4,455 feet altitude) creating a watershed that has an east - west direction and is formed on the western slopes of the Cordillera Occidental, El Corazón and Atacazo hills, has an contribution area of 514 km2, the main channel length is 42.5 Km, the average slope represents 42.7%. This river join with the Toachi and then form the Blanco river which in turn join the Quinindé river and then flow into the Esmeraldas hydrographic system which drains in the Pacific Ocean.

As shown in Table 1 the hydrologic complex that conform the area of interest of this document lies in a territorial mosaic of three provinces, three counties and three rural parishes. There more than 10,000 people live in more than 35 communities.

Table 1.- Territorial jurisdicctions of the Toachi-Pilaton watershed

PROVINCE	COUNTY	PARISH	MAIN COMMUNITIES
Pichincha	Mejía	Manuel Cornejo Astorga	La Esperie
			La Palma
			Mirabad
			Pampas Argentinas
Cotopaxi	Sigchos	Palo Quemado	Praderas Del Toachi
			Palo Quemado
			Santa Rosa
Santo Domingo de los Tsachilas	Santo Domingo	Alluriquin	Unión Del Toachi
			Alluriquín

Because of the altitudinal variability this territory is biologically rich. It contains from the paramo ecosystem at more than 9,000 feet altitude to tropical and cloud forest at about 1,000 feet altitude. This natural configuration of the area explains the existence of several ecosystems and watershed, and then of a rich biological diversity. The most important watersheds of this hydro-geologic system are those of the Toachi and Pilatón rivers. Smaller watersheds in this ecological reserve are of the Zarapullo river, which drains to the Toachi and the Corazon and Santa Ana rivers which drains to the Pilaton.

In the Toachi river basin, the largest area corresponds to natural forest (22.8%), followed by páramo (18%) and forest intervened plus cultivated grass 70-30 with 15.4%, the remaining area (43.8%) corresponds to others Types of land use mainly

crops In the Pilatón river basin; The largest occupation corresponds to natural forest (52.8%) and forest intervened plus cultivated grass 70-30 (31%), the remaining 16.2% is destined for other uses.

The natural richness of this natural compound has guided the human interventions in the area, which is still basically a frontier. Practically all the socioeconomic activities in the region rely in the extraction of primary natural resources. One of the major problems in the upper part of both basins is the transformation of the natural ecosystems of paramo and forest due to agricultural activities. This change in vegetation cover affects the surface runoff.

This ecological complex is important for hydric resources and because of its biodiversity, for the reproduction of both the flora and fauna of the region and then, important for ensuring water and food security of the local communities. Then the importance of the Toachi-Pilaton watershed must be understood under the complex natural mechanisms of biodiversity and hydric natural resource availability in which the local communities have built their culture and food and water security.

Areas under conservation status

Because of its natural landscape and biological importance the area of study have several public and private protected areas. The public areas under conservation statuses are Sarapullo and Toachi Pilaton Protected Forests and the Ilinizas Ecologic Reserve. The private protected areas have been created under the category of "protected forests" that was the first category for conservation of natural areas allowed in private lands before 2008 when the national constitution established the creation of private and public decentralized[2] ecological reserves. The protected forest is an administrative figure for conserving soil and hydric resources and in function of these primary goals is considered that forests and natural or introduced vegetation must be maintained undisturbed in critical areas of the watersheds. By creating protected forests the state promoted the protection of the steepest areas of the watersheds and then avoiding landslides, land erosion and drainage alterations.

Ilinizas Ecologic Reserve and Sarapullo Protected Forest

The llinizas Ecological Reserve is a public protected area consisting of 149,900 has of paramo and Andean Humid and Subtropical Forests. It is located in the provinces of Cotopaxi and Pichincha. This area encompasses the twin peaks of the Illinizas as well as the extinct volcano Quilotoa best known by its crater lake. The reserve lie in the Cordillera Occidental de los Andes its territotry contains also several hillas and ranges like the Lelia Cordillera, the El Corazón, Jaligua Alto and Tenefuerte hills. This mountain system barrier the evaporations from the costal forcing its condensation in the west side of the Cordillera Occidental and therefore increasing the hydric resources of the watersheds or even favoring the creation of micro-watersheds in the entire area.

[2] Before the National Constitution of 2008, protected areas of any kind were created only under the central government control, With the new legal framework of 2008 municipalities and rural parishes can create their own protected areas and rural communities, indigenous people and private owners can also legally create areas for conservation in the lands under their control. See: article xxx of the National Constitution.

The Sarapullo Protected Forest was created in 1986 before the Ilinizas Ecological Reserve which creation was in XXX and with less territory. Then when the Ilinizas was declared as a reserve the entire territory of the Sarapullo forest was incorporated in such new protected area. So now in practice all the policies and management measures regarding this area are made considering the main area that is the Ilinizas Ecological Reserve.

Toachi – Pilatón Protected Forest

This protected forest was created in 1987 as a means to maintain unchanged the forest other vegetation of the Toachi and Pilatón river basins. This forest has an area of 212,000 has and is under the control of the state forest districts of Cotopaxi and Pichincha. Although the status of protected forest is lesser than the national parks and ecological reserves it is still prohibited logging and the use of the area for any socioeconomic activity. Activities in this type of areas must be compatible with conservation purposes only. The main goals of this area are the protection of soil, water resources and biodiversity. About 20% of the Palo Quemado territory lies in this protected forest and the Las Pampas parish is also next to this area. Most of the problems of the Toachi Pilaton protected forest become from the socioeconomic activities of the mentioned parishes.

The international environmental organizations *Birdlife Internacional* and Conservación Internacional have stated that the lower area of the Toachi Pilaton protected forest is a place of high importance for protecting birds because about 420 bird species has been found here. However insufficient control has promoted illegal logging and even the invasion of parts of the area for cattle ranching are damaging the habitats of these and other species existent here. Moreover, several land tenure issues have not yet solved in this ecological area.

Private protected forest

Protected forests and reserve have been created in private lands in the Toachi-Pilaton watershed. These areas combine conservations goals with scientific research, environmental education, organic agriculture, and eco-tourism activities so that are source of income generation for their owners. The creation of protected areas in private lands in this zone is a very important form to show the neighbors that other socioeconomic uses can be applied to the lands. As a frontier area, the Toachi Pilaton watershed system has been traditionally seen as a wilder or an area to mine any existent natural resource. Such mentality is still present and private owner who devote their lands to conservation purposes are helping to change such extractive view.

Typically private conservation areas are composed by temperate, cloudy and subtropical forests. Significant parts of these areas are secondary and highly degraded forest for which programs of ecological recovery has been established. Reforestation activities in areas previously used for agriculture are also in process. In addition by creating this type of conservation areas many steep zones of the hills and ridges are being protected otherwise they would be subject of forest fires, illegal logging and unsustainable agriculture.

The private areas that have been legally declared as reserves or protected forests are the following:

1. Reserva Biológica La Esperanza
2. Hesperia Biological station and reserve
3. Otongachi biológical reserve
4. Río Guajalito Scientific Station
5. Tanti protected forest
6. Rio Lelia watershed protected forest
7. La Favorita Scientific Station

In practical terms these private areas for conservation provide patches of ecological security for birds, mammals and other migratory species that need of scattered habitats to survive. They are also creating biological corridors and then allowing genetic variability in areas that otherwise would be isolated and prone to genetic erosion.

Notwithstanding the importance of private protected areas it is worth to mention that a significant flaw of them is the lack of sufficient resources for ensuring adequate control and the application of technically standardized management practices. This observation is also valid for the public protected forests for which the state has not established a particular administrative mechanism for control and management. However, new legal frameworks and technical regulations for this type of areas are under preparation by the Ministerio del Ambiente.

The Socio Bosque and the conservation initiatives in the area

In addition to the public and private system for protecting the natural areas of the watershed the Ministerio del Ambiente has established the nationwide Socio Bosque program which main goal is to help private owners and parishes to protect the existent natural forests presents in their lands or to carry out reforestation plans. The Manuel Cornejo Astorga, Palo Quemado and Alluriquin rural parishes are beneficiaries of the Socio Bosque program and about 692 hectares of public and private forests areas are under this scheme of protection, distributed in 22 plots and 15 private owners.

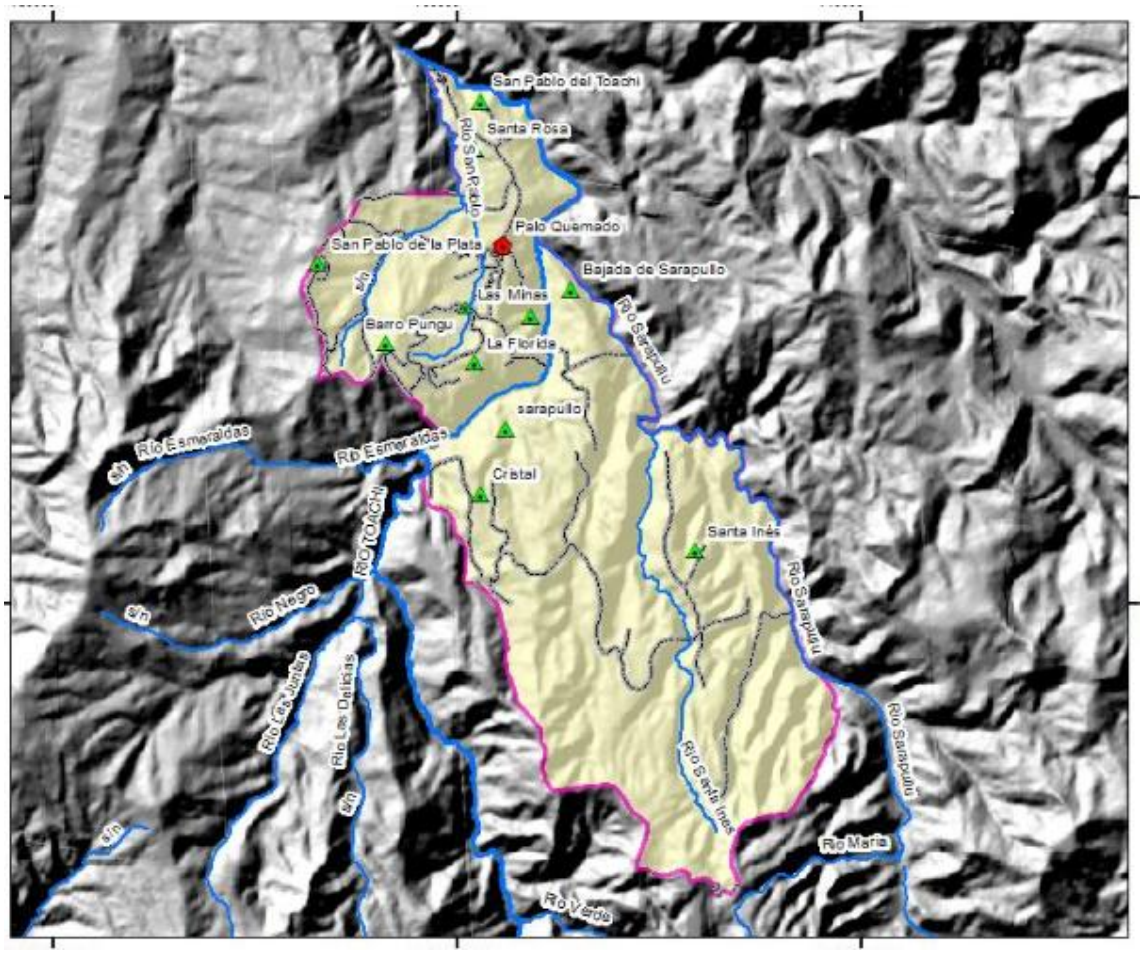
LOCAL JURISDICTIONS IN THE TOACHI PILATON WATERSHED

The Toachi Pilaton watershed lies in the territories of three provinces, three counties and six rural parishes. However, only three rural parishes are directly involved in the socioeconomic issues evolving and affecting this area. For that in this section wil be presented a general socioeconomic overview of the Palo Quemado, Manuel Cornejo Astorga and Alluriquin rural parishes.

Palo Quemado Rural Parish:

Palo Quemado is a rural parish depending of the Sigchos county and Cotopaxi province. It is located at 4,500 feet altitude right next to the flanks of the Toachi river watershed (Map 1). In terms of road connectivity, this jurisdiction is served by a second order road, which connects Sigchos and the rural town of La Union.

Map 1.- Palo Quemado Rural Parish

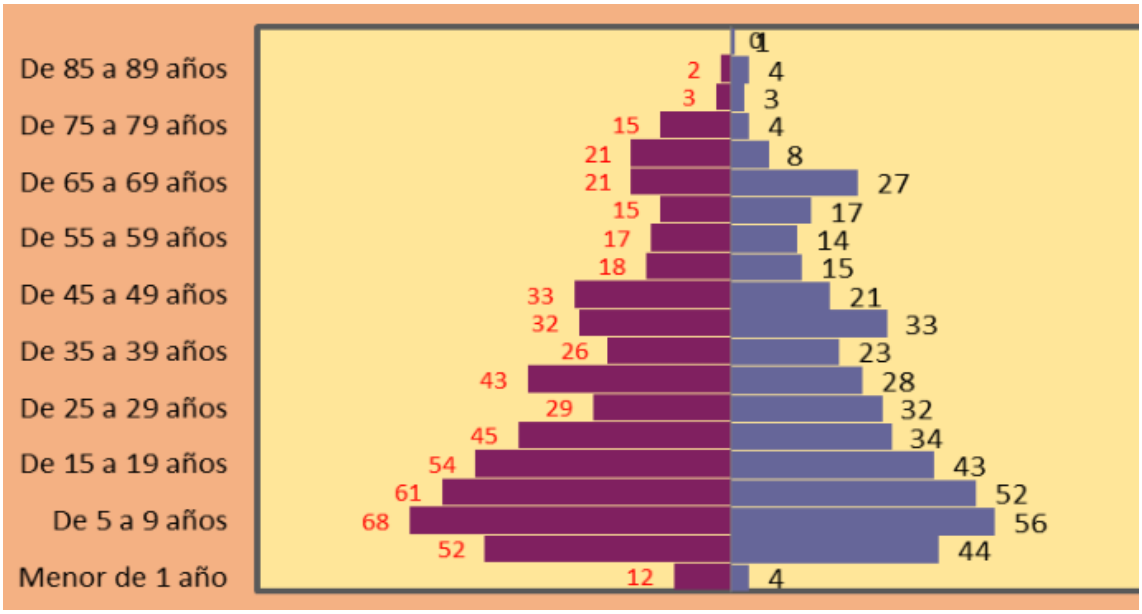


Source: GAD-PQ 2015.

According the last census (INEC 2010) the total population of this parish is of 1,030 inhabitants (55% men and 45% women) who live in eight townships or communities as follows: Palo Quemado Centro, San Pablo de la Plata, Las Praderas, Santa Rosa de Lima, Las Minas de la Plata, El Cristal, Zarapullo, and La Florida.

According to the national census (INEC 2010) the women-men correlation in Palo Quemado is 55-45%. The 57% of the population is under 30 years old and 30% are in the age range of 15-30 years old. (Figure 1)

Figure 1.- Age distribution in the Palo Quemado Rural Parish



Source GAD-PQ 2015

Ethnic self-representation in this parish is basically the "mestizo" accounting the 80% of the population. "Montubios" with 11% of the people is the second form of ethnic identity, and white 5%. There are no other forms of ethnic self-identification. (GAD-PQ 2015)

The subsistence of this population comes from small scale agriculture and cattle ranching. Sugar cane and raw milk are the most important products providing about the 75% of the work opportunities in this jurisdiction. While the cane is processed in the locality the milk is sold in the cities of Latacunga and Santo Domingo. The workforce of Palo Quemado is composed of 504 people.

According to the national last census (INEC 2010), 234 people of this parish work in agriculture and cattle ranching activities and 141 in manufacture activities, which is basically the production of panela, the most important product of this locality. Other relevant activities are related with services: local trade, transportation and education.

Palo Quemado is an important regional producer of "panela"[3] which is the main source of local income. The panela made in this parish is sold practically in all the central Andean area. In the last few years the sugar cane producers have started producing granulated brown sugar, which is being well accepted in urban regional markets as an healthy alternative to the centrifuged white sugar.

[3] Panela is basically the unrefined whole cane sugar. It is the result of boiling and evaporating raw sugarcane juice and then poured into molds to obtain hard round blocks for easy transportation. Each block has a standard weight of 32 pounds.

Other local socioeconomic activities in Palo Quemado are around local transportation (regular shifts to La Union, Alluriquin and Santo Domingo), local trade of rural utensils, staples, agrichemicals and other products and artifacts required for living in the rural environment of the parish. Modest production of fruits and tuberous like naranjilla, limón, naranja, banana, tree tomato, camote, yuca, papa china, among other is mostly used for family consumption and local exchange.

The most important local organizations are the associations Flor de Caña formed by the sugar cane producers and the Asociación Agroartesanal San Pablo de la Plata created by agriculture and cattle ranching producers. Most of the economically active people in the parish are member of either one of these organizations.

Finally it is important to note that the territory of Palo Quemado has some mine resources, especially gold and copper. Concessions of about 2,347 hectares[4] of the parish territory have been established for mining purposes. Tt the moment three mine sites are in the area (Table 2), however this activity is still not relevant for the local economy and the companies working there have not significant relation neither with local authorities nor with the socioeconomic life of the parish.

Table 2.- Mining places in the Palo Quemado Parish

PLACE	MINE COMPANY	TYPE	AREA
La Florida	Sultana del Còndor Minera Sulcomi SA	Metallic	642
Loma del Tigre	Sultana del Còndor Minera Sulcomi SA	Metallic	1658
Toachi	GADs Sigchos and Pichincha	No-Metallic[5]	47
		TOTAL	2347

The mines operated by the Sigchos Municipality and the Consejo Provincial de Pichincha are natural deposits for temporal extraction of sand, crushed stone and aggregate for construction needed for road construction and maintenance and other public works. According the mining legislation, the nonmetallic mining is under the control of the municipalities while the metallic one is controlled by the central government so that the local governments, Junta Parroquial has nothing to do with this activity and then it has a no relevant role in the local economy.

Based in the national census 2010, Table 3 shows a comprehensive overview of the parish.

Table 3.- Socioeconomic Overview of the Palo Quemado Parish

Sector / Indicator	Measure	Palo Quemado
Illiteracy	% (15 years old or more)	9.54
Functional illiteracy	% (15 years old or more)	15.91

[4] Typically the mine concession areas are higher than the actual place of mine activity. So although a concession can be of hundred or thousand hectares, the place where the mine resource is extracted is significantly smaller.

[5] Nonmetallic mining is for extracting sand, gravel; rock stone and other related mine products.

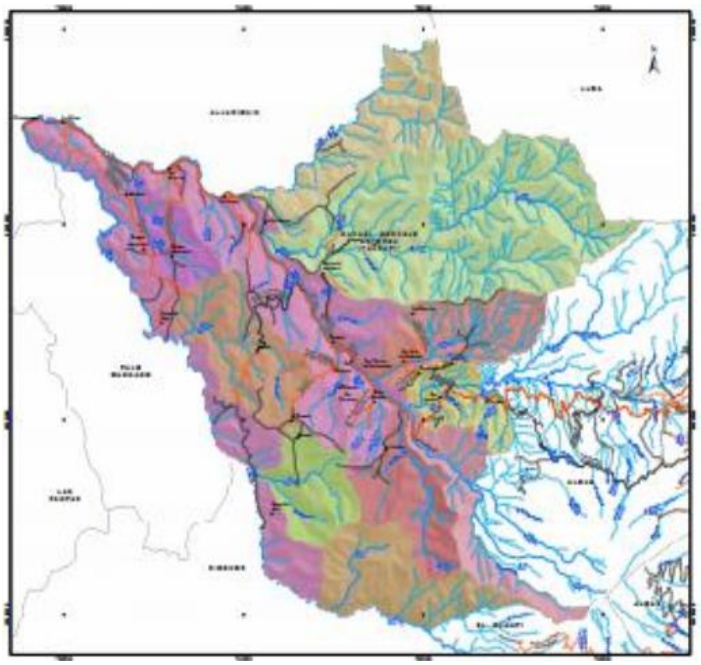
Education	Años de estudio	6.84
Universitary education	% (24 years old or more)	4.77
Complete Elementary School	% (12 years old or more)	81.11
Complete High School	% (18 years old or more)	18.86
Working children 15 - 17 years old	% (children 5-17 years old)	46.15
Working children 5 - 14 years old	% (children 5-14 years old)	6.75
Peoble economically active	Number	504.00
People in working age	Number	794.00
Afroecuadorian population	Number	16.00
White population	Number	47.00
Total population	Number	1,030.00
Men population	Number	567.00
Indigenous people	Number	8.00
Mestizo population	Number	846.00
Women population	Number	463.00
Women proportion	% (total population)	44.95
Extreme poverty for non-satisfied basic needs	% (total population)	33.60
Poverty for non-satisfied basic needs	% (total population)	95.60
Human Development Bonus	Number	314.00
Water service inside home	% (houses)	11.37
Sewage network	% (houses)	9.41
Electric service	% (houses)	85.49
Telephone land line	% (houses)	11.40
Gas use for cooking	% (homes)	83.65
Firewood / charcoal use for cooking	% (homes)	15.20
Own home	% (homes)	79.46

The data shows that this rural parish presents some signs of acute social vulnerability. For example, education, water and sewage services are insufficient,

Manuel Cornejo Astorga (Tandapi) Rural Parish

Although the official name of this rural parish is Manuel Cornejo Astorga, the name of the main town in the territory is known as Tandapi, a traditional name since this side road town was created. It is located in the Pilaton watershed and next to the Aloag-Santo Domingo road, the most important artery to communicate Quito and Guayaquil, the main Ecuadorian cities (Map 2). The area of this parish is of 495,89 km2, with an altitudinal range between the 3,800 feet and 8,000 feet. According the national census of 2010 the population is of 3,661 people of which 60% (2,197) is considered economically active.

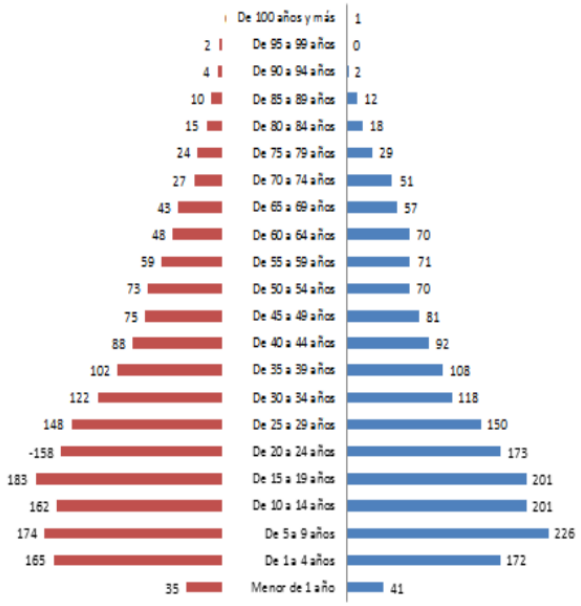
Map 2.- The Manuel Cornejo Astorga – Tandapi Rural Prish



According to the national census (INEC 2010) the women-men correlation is 53-47%. The 68% of the population is under 40 years old and 30% are in the age range of 15-30 years old. (Figure 2)

The most extended ethnic self-representation in this parish is basically that of "mestizo" representing almost the 90% of the local population. Other ethnic self-representation are white (4.5), indigenous (4%), and Afroecuadorian (2.2%).

Figure 2.- Age distribution in the Manuel Cornejo Astorga – Tandapi Rural Parish



Source: GAD-MCA 2012

The main economic activities in this rural parish are related to agriculture, livestock, milk and meat production, flower, tourism, and transportation. Agriculture and livestock are the main sources of income and subsistence for the local population representing the 46% of the entire economic activities in the parish. Trade and small business represent the 11.5% of the economic activities. Food and accommodation represent 7.78 % (Table 4). The most important products are maize, cocoa, cassava, banana, oil palm, potatoes, cereals, maize, beans, quinoa, vegetables,[6] pork and chicken meat, milk, fish.

Table 4.- Economic activities in the Manuel Cornejo Astorga – Tandapi Rural Parish

RAMA DE ACTIVIDAD	CASOS	%
Agricultura, ganadería, silvicultura y pesca	806	46,78
Industrias manufactureras	57	3,31
Suministro de electricidad, gas, vapor y aire acondicionado	9	0,52
Distribución de agua, alcantarillado y gestión de deshechos	7	0,41
Construcción	71	4,12
Comercio al por mayor y menor	199	11,55
Transporte y almacenamiento	78	4,53
Actividades de alojamiento y servicio de comidas	134	7,78
Información y comunicación	5	0,29
Actividades financieras y de seguros	1	0,06
Actividades profesionales, científicas y técnicas	7	0,41
Actividades de servicios administrativos y de apoyo	42	2,44
Administración pública y defensa	14	0,81
Enseñanza	40	2,32
Actividades de la atención de la salud humana	6	0,35
Artes, entretenimiento y recreación	3	0,17
Otras actividades de servicios	12	0,70
Actividades de los hogares como empleadores	56	3,25
No declarado	155	9,00
Trabajador nuevo	21	1,22
	1723	100

Source: GAD-MCA 2012.

Nonmetallic mine is also an important economic activity in the area. According the local authorities 31 mine deposits are in the parish territory, which represent more than the 20% of the national offer of nonmetallic products. Important amounts of rock stone

[6] These are products for warm and cold weather, favored by the location of the parish between the Coast and Sierra regions.

and gravel are extracted from the Pilatón river banks mostly for being used at the Hidrotoapi hydroelectric project the most important public work in this region.

Based in the national census 2010, Table 5 shows a comprehensive overview of the parish.

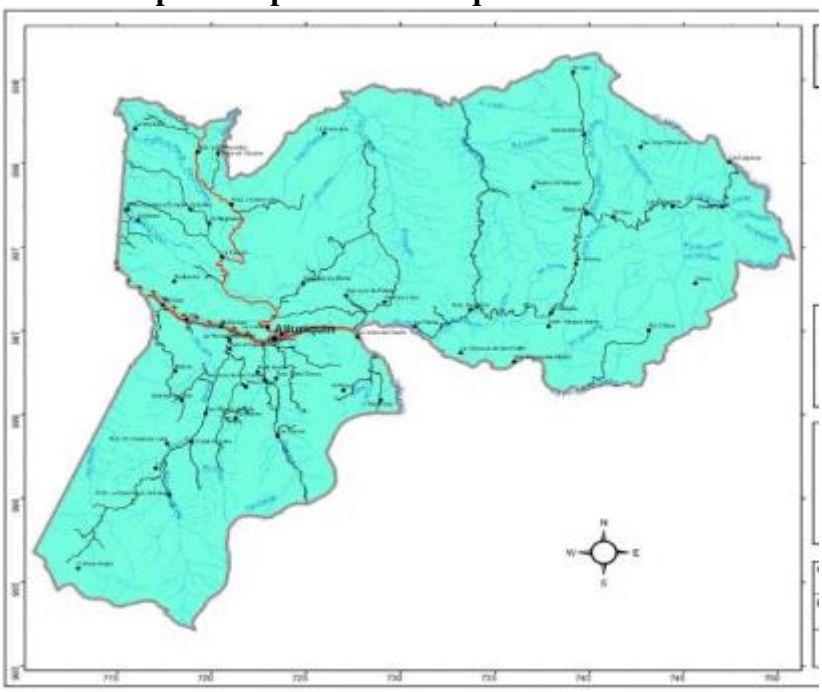
Table 5.- Socioeconomic Overview of the Manuel Cornejo Astorga – Tandapi Parish

Sector / Indicator	Measure	MCA (Tandapi)
Illiteracy	% (15 years old or more)	10.22
Functional illiteracy	% (15 years old or more)	22.95
Education	Años de estudio	6.73
Universitary education	% (24 years old or more)	5.51
Complete Elementary School	% (12 years old or more)	79.52
Complete High School	% (18 years old or more)	19.10
Working children 15 - 17 years old	% (children 5-17 years old)	38.52
Working children 5 - 14 years old	% (children 5-14 years old)	9.96
Peoble economically active	Number	1,708.00
People in working age	Number	2,848.00
Afroecuadorian population	Number	87.00
White population	Number	168.00
Total population	Number	3,661.00
Men population	Number	1,944.00
Indigenous people	Number	149.00
Mestizo population	Number	3,154.00
Women population	Number	1,717.00
Women proportion	% (total population)	46.89
Extreme poverty for non-satisfied basic needs	% (total population)	27.70
Poverty for non-satisfied basic needs	% (total population)	83.50
Human Development Bonus	Number	670.00
Water service inside home	% (houses)	26.05
Sewage network	% (houses)	34.70
Electric service	% (houses)	83.93
Telephone land line	% (houses)	16.03
Gas use for cooking	% (homes)	83.86
Firewood / charcoal use for cooking	% (homes)	14.28
Own home	% (homes)	56.83

Alluriquin Rural Parish

Alluriquin is a rural parish that belongs to the county of the Santo Domingo de los Tsachilas and its homonymous province. It has 9,725 inhabitants (INEC 2010) and an area of 664,8 Km2. (Map 3)

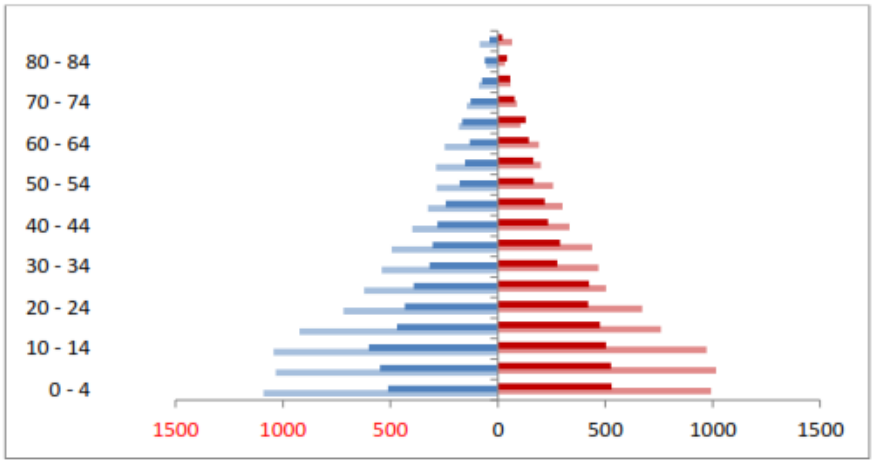
Map 3.- Map of the Alluriquin Rural Parish



Source: GAD-A 2015

According to the national census (INEC 2010) the women-men correlation is 52-48%. The 67% of the population is under 40 years old and 31% are in the age range of 15-30 years old. (Figure 3Figure 2). Like in other parishes of the region, most of the population of Alluriquin is ethnically self-identified with mestizo (90%), being the remaining people identified as white (5%) Afroecuadorian (2%), indigenous (1%), and the rest as "mulato", "negro", and "montubio" ethnicities.

Figure 3.- Age distribution in the Alluriquin ruralParish



Source: GAD-A 2015

The population in working-age (PWE) is defined as all those over 10 years old who are considered to be able to work. The PWE in Alluriquín corresponds to 78.24% of its total population. However, the Economically Active Population (EAP) is another indicator that best describe labor supply. The EAP is any population in age to work who is capable and willing to do so at a given moment. It includes both people who work or have jobs (occupied EAP) and those who do not have work but are willing to do so (unemployed EAP). In Alluriquín the EAP is of 3,792 people, which constitutes 49.84% of PWE and is made up of 73.10% of men and 26.90% of women.

On the other hand, Alluriquin is the third parish in the province with the highest poverty rate with an 89.6% of unsatisfied basic needs. According to INEC (2010) only the 55% of the dwellings in the village receive water from the public network, 44% take this resource from the rivers or springs and wells. Sewage service is also insufficient here. Only the 20% of the homes are connected to the public network, 29% to a septic tank, 19% have direct discharge to rivers and streams, 17% of the homes are connected to a blind well, 12% has no sewage service at all and 3% have latrine.

Land coverage is composed by 32.5 % of natural forests, 61% of introduced grass and the remaining 6.5% is composed of permanent and semi-permanent crops, planted forests and riparian vegetation (SDT 2010; MAGAP-SENPLADES, 2014). These numbers speaks of the importance of livestock for local people. Livestock, agriculture, forestry and fishing cover more than the half of the whole economic activities in the parish. Far below, other relevant activities in this territory are manufacturing industries, construction, transportation and storage, accommodation, and catering services among others (Table 6).

Table 6.- Economic activities in the Alluriquin Rural Parish

Activity	%	Records
Agriculture, livestock, forestry and fishing	57.57%	2,183
Wholesale and retail trade	10.36%	393
Manufacturing industries	7.20%	273
Transportation and storage	4.03%	153

Accommodation and catering services	2.37%	90
Construction	2.22%	84
Government and public administration	1,19 %	45

The topography in Alluriquín characterized by steep slopes provides to this territory abundant water and biological resources, which have determined the main economic activities of the local society based in agriculture and livestock and the extraction of natural resources (Table 6).

Hills, ridges, and micro watersheds have created conditions for biodiversity and scenic views, but these conditions also turn this area vulnerable to landslides, deluges and spates. In fact, Alluriquin undergo a catastrophic spate in April 2016 when record precipitations occurred in a single night. Four people died in that event, which also caused important material damages like the destruction of houses and buildings included the seat of the local government and part of the road Aloag-Santo Domingo cutting then for few days one of the most important routes that connect the Sierra and Costa regions (EC 2016). According to local authorities, more than 75% of the territory has high and medium-high susceptibility to landslides, spate, deluges and flooding. (GAD-A 2015).

Although these issues of territorial vulnerability the parish must also deal with economic activities that would increase the risks to adverse events. According to the Agencia de Regulación y Control Minero, the governmental mining agency, in the Alluriquín territory there are the following concesions: i) M-10 granted to Teegra Ecuador S.A.; ii) La Florida 1 granted to Caselogic, and iii) Loma del Tigre, granted to Sultana del Cóndor Minera (Sulcomi S.A)[7]. The mine resources existing in the territory are basically gold, silver and cooper. Nonmetallic mine activities also exist in the banks of the Toachi, Pilatón, Mulaute and El Tránsito rivers where sand, crushed stone and other similar materials are extracted. As known, the mine industry needs to remove large amounts of rocks, sand and mud in the mine siting process opening pits and quarries. This cause soil instability and then promotes erosion and landslides. Other activities that cause negative impacts in the soil are logging and unsustainable agriculture and cattle ranching, which remove the natural vegetation facilitating the water infiltration in the soil making this less able to maintain its stability during intense rainfall.

Based in the national census 2010, Table 6 shows a comprehensive overview of the parish.

Table 7.- Socioeconomic overview of the Alluriquin Rural Parish

Sector / Indicator	Measure	Alluriquín
Illiteracy	% (15 years old or more)	9.34

[7] This mining company also works in the territory of the Palo Quemado parish. The "Loma del Tigre" hill lie between the territory of the Alluriquin and Palo Quemado parishes.

Functional illiteracy	% (15 years old or more)	20.72
Education	Años de estudio	7.11
Universitary education	% (24 years old or more)	6.11
Complete Elementary School	% (12 years old or more)	84.12
Complete High School	% (18 years old or more)	21.28
Working children 15 - 17 years old	% (children 5-17 years old)	26.62
Working children 5 - 14 years old	% (children 5-14 years old)	4.54
Peoble economically active	Number	3,792.00
People in working age	Number	7,609.00
Afroecuadorian population	Number	319.00
White population	Number	450.00
Total population	Number	9,725.00
Men population	Number	5,023.00
Indigenous people	Number	111.00
Mestizo population	Number	8,715.00
Women population	Number	4,702.00
Women proportion	% (total population)	48.34
Extreme poverty for non-satisfied basic needs	% (total population)	32.50
Poverty for non-satisfied basic needs	% (total population)	93.90
Human Development Bonus	Number	3,651.00
Water service inside home	% (houses)	12.05
Sewage network	% (houses)	19.80
Electric service	% (houses)	87.50
Telephone land line	% (houses)	13.17
Gas use for cooking	% (homes)	87.18
Firewood / charcoal use for cooking	% (homes)	11.55
Own home	% (homes)	53.95

STAKEHOLDERS AND PERCEPTIONS ON CLIMATIC ISSUES

As described above the Toachi-Pilaton watershed is a natural framework of intense socioeconomic exchange where people and organizations of diverse type and range exert their interests in order to get and influence management of the existent natural resources. This approach is helpful for understanding that any measure for promoting sustainable development, water management or adaptation strategies for climate change and vulnerabilities should be the result of the dialogue among the different stakeholders of the area.

This part of the report is based on fieldwork carried out in the three rural counties in June 2016. During the field work was used semistructured questionnaires to interview representatives of the Cotopaxi, Sigchos, Mejia, Alluriquin, Palo Quemado, and Manuel Cornejo Astorga GADs, representatives of the Environmental and Communitarian sections of the Hidrotoachi project, members of productive organizations, and local residents. People interviewed were asked how they perceived climate issues and how they think they affect the daily life of the people.

Questions during the interviews looked for understanding five basic issues:

- What kind of weather issues are occurring in the area of study,
- How they are affecting the local people and socioeconomic activities,
- What are the explanations of local people to these events,
- What is the understanding of climate change phenomenon; and,
- How concerned are local authorities in watershed management and climate issues in the Toachi-Pilatón watershed.

These questions were helpful to know the perception and the level of preparedness for climatic events and issues of vulnerability in the area.

Stakeholders in the area

Stakeholders or Interest Groups are people and entities with a declared or conceivable interest or stake in the management of a given area. Stakeholders are not necessary organized they can be of any form, size and capacity like individuals, organizations, or even unorganized groups. In the Toachi Pilaton watershed stakeholders fall into the following categories:

State actors:

- Administrative agencies: MAE, INAMHI, CELEC
- Regional GADS: Pichincha, Cotopaxi and Santo Domingo de los Tsachilas provinces,
- Suregional GADs: Mejía (Pichincha), Sigchos (Cotopaxi), and Santo Domingo (Santo Domingo de los Tsachilas)
- Local GADS Manuel Cornejo Astorga, Palo Quemado and Alluriquin;
- Junta de Agua de Santa Rosa (Palo Quemado)

Private sector:

- Ranchers and farmers
- Companies and projects:

    - HidroToapi hydroelectrical project
    - Sultana del Còndor Minera Sulcomi SA (Palo Quemado)
    - Toachi GADs Sigchos and Pichincha mining processing sites (Palo Quemado)
    - Teegra Ecuador S.A. (Alluriquin)
    - Caselogic (Alluriquin)
    - Sultana del Cóndor Minera (Sulcomi S.A), Loma del Tigre concession (Alluriquin).

Civil society and foundations

- Fundación Tangaré (Tandapi)
- Reserva Biológica La Esperanza
- Hesperia Biological station and reserve
- Otongachi biológical reserve
- Río Guajalito Scientific Station
- Tanti protected forest
- Rio Lelia watershed protected forest
- La Favorita Scientific Station

Productive organizations

- ORCOPROSAN - Organización comunitaria productiva Santa Rosa Lima. (Palo Quemado)
- Asociación Flor de Caña (Palo Quemado)
- Asociación de Ganaderos de las Pampas (Pampas Agüilla)
- Asociación Agroartesanal San Pablo de la Plata (Pampas Agüilla)
- Pre-Asociación de Cafetaleros (Tandapi)
- Pre-Asociación de Cafetaleros (La Esperie)
- Asociación de Productores Agropecuarios “Pampas Argentinas” (Tandapi)
- Asociación Agropecuaria Mirabad (Tandapi)

Coomunities and local Interest groups

- Unión del Toachi (Alluriquin)
- La Esperanza community (Tandapi)
- El Mirador community (Tandapi)
- Mirabad community (Tandapi)
- El Paraíso community (Tandapi)
- San Francisco community (Tandapi)
- Los Olivos community (Tandapi)
- Peñas Blancas community (Tandapi)
- Ilusión community (Tandapi)

- Canchacoto community (Tandapi)
- Iliolan community (Tandapi)
- Cordilleras del Paraíso community (Tandapi)
- San Antonio community (Tandapi)
- La Esperie community (Tandapi)
- La Palma community (Tandapi)
- Pampas Argentinas community (Tandapi)
- Praderas del Toachi community (Palo Quemado)
- Palo Quemado Centro community (Palo Quemado)
- San Pablo de la Plata community (Palo Quemado)
- Las Praderas community (Palo Quemado)
- Santa Rosa de Lima community (Palo Quemado)
- Las Minas de la Plata community (Palo Quemado)
- El Cristal community (Palo Quemado)
- Zarapullo community (Palo Quemado)
- La Florida community (Palo Quemado)
- Unidad Educativa Juan Salinas (Palo Quemado)

First of all it is important to consider that there is not any encompassing process that calls the attention of all the listed stakeholders in the context of the context of watershed management. This does not mean that they do not have interest and/or exert influence in the watershed issues but that there is not coordination or dialogues in terms of management initiatives. This is largely due to the fact that according the national Constitution the regional descentralized governments are invested with the exclusive competence for watershed planning and for creating watershed council to carry out its management. [8] Besides the conservation, recuperation and integrated management of water resources are also under the state responsibility through the regional governments[9] This competence bestow these governments to regulate all activities that can affect the water quality and quantity and the ecosystemic equilibrium especially y water recharge areas[10].

Although the importance of the legal framework regarding watersheds, the regional governments have not been created yet, so their competences are not fully executed by any public organization. As a result there are not administrative councils for watershed managements and no control agency that can assure an overview of all the watershed of the country. Some control activities regarding these areas are carried out by the Ministerio del Ambiente and Ministerio de Agricultura Ganadería, Acuacultura y Pesca. MAGAP but in any case an integrated policy of management and control can be applied by several and dispersed organizations.

Provincial governments have the competence for promoting public works in watershed of all type in their territories and to carry out the environmental management. However these competences can be conflictive since the promoting of public works means the construction of roads, irrigation channels, bridges and other infrastructure that can impact watershed if environmental issues are not considered. In addition, not all

[8] See articles 262 and 263 of national Constitution.
[9] See article 411 of national Constitution.
[10] Idem.

provincial governments have still authorization for environmental management[11] so in practice no competences over watershed can be applied.

Another issue regarding one of the productive stakeholders in the watershed is the mining activity. As known mining is among the most nature transformation activities and typically they are executed in very difficult to access areas where rural governments are more efficient to reach. However according the national law, metallic mining activities are under the control of the central government and non-metallic mining under the municipal governments. In the area of study there are six metallic mining concessions and a number of non-metallic extracting places. Since rock, sand, stone and other non-metallic mine resources are abundant in the area it is virtually impossible for the local municipalities to control all of them. Companies granted with metallic mine concessions report to ARCOM (Agencia de Regulaciòn and Control Minero) and not to local rural parishes in whose territories the environmental impacts occur. As a result, mining companies work in the area but have not relationship with local organizations.

The effect of the above explained situation is that there is not any organization in the Toachi-Pilaton watershed that can carry out a comprehensive management of the existing hydric resources and to coordinate activities of the local public organizations in order to establish management activities for the control and conservation of the area.

Two institutions only are carrying some type of activities in coordination with local authorities, and other stakeholders. They are the MAE in the framework of Plan Bosque, in which coordination at different levels is performed with rural parishes, communitarian organizations and forest private owners. The other organization is the Hidrotoapi Hydroelectric Project, a large infrastructure construction executed by a private company under the order of the central government. As a part of the environmental requirements Hidrotoapi must execute communitarian consultation in the area of direct and indirect impact of such project. In order to fulfill such need this project has organized a comprehensive plan to inform local communities about potential environmental and socioeconomic impacts that can affect local livelihoods.

In the above mentioned scenario, the local stakeholders has few opportunities for communication, coordination and exchange strategies for organizing their activities in a sustainable way or at least to make them more efficient. On the other hand, the absence of a management straggles leave the stakeholders to perform their activities at large with a minimum of considerations for the security and sustainable use of the watershed.

Climate issues in the Toachi Pilaton watershed

Four climatic issues were mentioned consistently during the interviews: drought, rainfalls, temperature increase and strong winds. The local people are now aware of the weather events and negative impacts since it is fresh in the memory the catastrophic spate in the Alluriquin parish occurred a couple months before the field work for this report and caused by record precipitations. Most of the communities of the parishes involved in this study have also experienced landslides in their lands in the last two years due to sudden and excessive rains. So for most of the interviewed people it is evident that changes in weather patterns have occurred over the last years and they are

[11] According the MAE legal framework only provincial and municipal governments that fulfil some requirements are bestowed for environmental management in their jurisdictions.

interconnected. Then awareness regarding climatic issues in the area has been triggered by the experience with such disasters which have affected practically all the region.[12]

Drought was considered an important issue especially in the Toachi watershed area. Communities of the upper basin like Palo Quemado and even of Sigchos referred that most of the year 2015 the entire area has suffered an extreme dry season. For communities of the lower basin it was not an issue because of the alternatives to offset the problem through the use of the river water, but for those of the higher and middle watershed it was more problematic because the river is far from the communities. However after several months of dryness there was a sudden rainy season including deluges that caused spate, mass movements and flooding in different communities of the lower and middle areas in the watershed.

Strong winds have also been reported during the interviews. These events occurred especially in Palo Quemado where the winds were so intense that several trees were uprooted. This weather condition is also pointed as part of the climate pattern change that is experiencing this region.

Effects of the weather issues on local socioeconomic activities,

Local people have been concerned of threats to the communities caused by changes in the climate patterns especially in terms of human and economic security (i.e. landslides, flooding and crops quality). Ongoing changes in weather patterns are seen acutely since the Lamas river spate occurred in April 2016 and the string of landslides and avalanches occurred in the last months of 2015 and first trimester of 2016 in different areas of the three involved counties.

The related weather events have affected negatively the local people in several ways. First, long periods of dryness and short but intense periods of rains are pointed as the cause of the decreasing of sugar cane quantity and quality. Sugar producers said that the panela production has significantly decreased in the last year because of the lack of the cane quality. Now they need more canes to produce the same amount of panela that is the standard for commercialization.[13] Other sectors like the cattle ranchers and agriculture producers have also experienced problems derived from extreme weather events. Low productivity, fungus and pest[14] increase, and plant destruction by intense rains are the most common problems the farmers attribute to weather problems. For that they need to use more agrichemicals and devote more time for caring the crops.

On the other hand extreme rains soften the soils of deforested areas or steep hills and produce landslides or mass movements and flooding. During the last months of 2015 and the early 2016 several landslides occurred in the entire region and in most of the cases closing paths and roads and then causing transportation problems sometimes for

[12] The spate occurred in the Damas River in Alluriquin have had an economic impact beyond the micro-region of the lower Toachi-Pilatón watershed. Since the Aloag Santo Domingo road was closed during few days it affected the transportation between Quito, Santo Domingo and Guayaquil. Some landslide occurred in the same period near to Tandapi also forced to close the Aloag Santo Domingo road.

[13] Each piece of panela or "banco" for commercialization weight 32 pounds.

[14] Pests can appear during dry or wet season, but now with the intense weather conditions have appeared others previously unknown. For example in the naranjilla crops were common the "lancha negra" and "lancha blanca" pest, but now have appeared two more the "ojo de pollo" and "muerte lenta", to control which farmers must apply more and stronger agrichemicals. This make costly some crops.

several days. In the Manuel Cornejo Astorga rural parish more than 200 small and medium scale landslides occurred in the last year. Practically all the 26 communities of the parish have had landslides in their territory. The worst landslide occurred in May 2016 at the point in the kilometer 32 of the Aloag - Santo Domingo road forcing to close it for a couple days.

As already explained the spate in the Damas River that caused avalanche and flooding in Alluriquin was the most extreme effect of the concentrated rains occurred in April 2016. Besides the actual damage that can cause a landslide if it occur over towns, houses or roads, it affect the transportation of products to the markets and some of them like milk and other perishable can be ruined at all causing significant economic damage to the producers.

Strong winds have less impact in the farmers however some crops can be affected and accidents can occur when trees are uprooted. However any of the interviewed has reported accidents due to this type of event. On the other hand, the combination of winds, drought and high temperature sparked some wildfires in the area, especially in Sigchos.

Finally considering the sharp contrasts of the dry and wet periods local people realize that during the drought there was also a significant increment of temperature. However it may be a subjective observation. In any case cases of skin irritation especially in children have been experienced in the communities of Palo Quemado and Pampas de Agüilla in the middle and upper part of the Toachi watershed.

Perceptions of local people regarding weather events

Experience has provided rural communities a knowledge about the local environment and climatic issues. Based in such knowledge these communities have designed a yearlong calendar determining periods for planting, cropping, applying agrichemicals for caring the crops, and even for festivities and other celebrations. However, when sudden changes in local conditions occur, the people tend to fall in fabrications and attributions in order to make an understanding of the new or extreme events.

Pyhälä et al (2016) has studied how people can easily astray when issues go beyond of what is considered normal in terms of their experimental knowledge. He calls it memory illusions in which facts from previous knowledge and new imaginations can be mixed to get sense of new realities. However this may affect the experiential knowledge of the communities acquired through daily observation of their environment. Precisely this has happened in the Toachi – Pilaton areas.

Common explanation of why the creeks of the lower basin area have become dry during 2015 is that the waters were sank through the cracks opened in the soil because of the dynamite explosions carried out to build the Hidrotoapi hydroelectric project. In the upper part of the basin there are also communitarian explanations based in the imagination. For example the drought that has affected most of the year during 2015 and 2016 becoming an overwhelming problem and even a political issue. Since this weather condition affected five counties of the Cotopaxi province included Sigchos in the upper part of the Toachi River, there was a public petition for creating “veedurias” or commissions in charge to investigate the cause of such abnormal drought (GAD-C

2016). In the communities sparked the idea that a program of "cloud seeding"[15] was being carried out by flower cultivators in order to produce rain in specific areas to favor their agribusiness (GAD-C 2016). The popular explanations to new or unknown events may have been caused by influential or fantastic memories of extreme events mixed with new situations observed in the area.

However people also retain some indicators of recurrent local problems and provide more scientific explanation for new events. For example the drought problem and the landslides occurred in the upper basin, has been explained by the productive associations as a direct result of the constant deforestation in the area. The association of panela producers, Flor de Caña has explained that farmers use now more trees every week to produce panela, so the nearest forest in Palo Quemado are being significantly degraded. This means also that logs for firing the cauldrons should be brought from more distant places which make more expensive the production.[16]

The above explanations show how stakeholders are eager to determine whether situations and to establish them in terms of what is their interest. Beyond of what true or false can be the explanations, this situation also show that local are prone to know about climate issues and that information, capacitation and measures implementation on climate change adaptation are needed.

Understanding on climate change and awareness of local authorities

There is not a clear understanding regarding climate change in the communities in the three counties. Climate change is still a far reality and then there is not a conception on how to take actions to response it. However the adverse events of rainfall, spate and landslides have suddenly forced the people to take a position regarding the recurrent and catastrophic events that occurred in the area.

The Alluriquin disaster made people aware that climate has changed and some collective actions should be adopted. It is obvious that local communities are now more favorable to protect forest especially in the steep areas of the river bank and hills. In addition private reserves are more popular and seen as something positive for the community.

Notwithstanding the increase in public awareness it is not easily translated to local authorities in terms to move them devise plans for bettering the watershed management or coordinating among the different institutions to take common measures. This situation is due to normative and practical issues. From the point of view of the national legislation, the responsibility for watershed management corresponds to the regional GADs which as has already said are still inexistent. These institutions are bestowed by the National Constitution and COOTAD[17] to carry out the management of the hydrographic systems. This means that parish GADs cannot take initiative in promoting

[15] This process consists in "seeding the heavy clouds with tiny particles of silver iodide whose electrical charge would pull together the cloud's water droplets. Once enough droplets had gathered together, their weight would make them fall from the sky as rain." See: http://www.dailymail.co.uk/sciencetech/article-1351437/Can-scientists-REALLY-make-rain-useless-shower.html#ixzz4V92o0FR7

[16] To address this problem, the Association Flor de Caña of Palo Quemado is working with Maquita Cushunchic, a fair trade organization based in Quito, to introduce more efficient technologies and improve the production.

[17] Código Orgánico de Ordenación Territorial y Administración Descentralizada.

watershed management activities. So in this case while local authorities (the parish GADs) may understand the climate change issues and the potential impacts that can produce in their territories, they do not feel that can take actions or decisions in response to such global event.

Another issue that conspire against the adoption of local measures for watershed management is that some activities that cause severe impacts in the hydrographic basin are not under the control of local governments (the parish GADs). For example metallic and nonmetallic mine activities are under the control of the central government and of the municipal GADs. As a result these activities are not reported to the local parish authorities –the most idoneous to locally verify any situation- and then the control of the problems caused by mine companies not always are known by the control agencies.

The related issues and perceptions in the Toachi-Pilaton watershed show that capacity-building and community-based education are important activities for raising awareness on climate change impacts and promoting adaptation measures. These approaches are important to promote sustainable livelihoods, food security and finally sustainable development.

Gender issues and vulnerable people

As in most of rural areas in Ecuador, gender is a complex issue. It is difficult to evaluate women issues mot only because there is an evident level of "machismo" but also because women have types of agency that do not necessarily have been analyzed by feminist studies and then may not fit in what gender inequality stands for.

The first aspect of gender inequality in the area is the invisibilization of the female work. Despite the current interest of the government for promoting women visibilization, most of the productive female activity is still not socially recognized, and in that sense it is not statistically reflected either. The division between labor for the market and domestic work is often diffused and part of the productive work ends up being counted as unrecognized domestic labor. In other words, female work counts only when it is sold in the market economy (as waged worker or as independent entrepreneur) but not when women work at home. Two factors contribute to this statistical invisibility: on the one hand the fact that all of the female home work has a high use value but it is of null exchange value. For example, cooking for the family, caring children, making the room and so on are activities that cannot be sold in the free market and then it is not worth or practical accounting them. On the other hand, the home female activities are seen as part of the gender work division so it is the task that women must contribute for family and social reproduction.

Beyond the above theoretical considerations since many men in the Toachi Pilaton area are increasingly incorporated in waged work activities, rural women have taken on bigger roles in agricultural production and community labour. The resulting effect of this fact is that the women must assume the place that men have left vacant and then must work an average of 14-16 hours daily. The personal impact of this social phenomenon can be devastating in terms of women health and of physical abuse from

husbands.[18] Here also is affected the right of women to have time for leisure, which in turn men enjoy in any case working in family subsistence activities or in waged work outside the town.

Notwithstanding evident gender inequality issues in the area of study it is also important to consider the women agency for creating income opportunities for their families. In practically all the areas women control most of the formal and informal food business. This provides them great economic independence counterbalancing home male-women asymmetries. In this case women are visibilized through a work inserted in the market economy.

Regarding other vulnerable people beyond women and children, there are no other particular groups that can be identified as vulnerable. Since the area of study of the Toachi Pilaton watershed is a frontier territory, there are no indigenous people nor Afroecuadorians.

[18] In rural areas women have reported health problems like of the spine, of respiratory and reproductive organs, hernias, bruises, and wounds (MacMillan 1995) and gender violence (Camacho 2014).

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Annex 9. Alternative approaches considered but not adopted in the project.

Barrier	Project action	Alternative approaches considered but not adopted
Local population not fully aware of climate-related impacts.	Prepare and execute a public communication and education plan (output 7)	At first, it was thought to concentrate on formal education actions. However, there is a need to inform and engage all local stakeholders. Therefore, it was decided to have a wide-spectrum action that includes communication and education to the range of local audiences.
Local development plans do not incorporate adaptation measures.	Mainstream in six development plans[1] measures for climate change adaptation with a watershed perspective (output 6).	At first, it was considered to concentrate on municipal development plans. However, during the consultation process it was clear that parrish governments are closer to the local population. In addition, municipal plans include the urban areas that have complex issues that are not within the scope of the present project proposal. Therefore, it was decided to focus on the parrish development plans of the five key parishes, and the municipal plan of Sigchos, which is majoritarian rural.
Local production is based on extensive farming practices.	Introduce sustainable farming practices in the two main activities (i.e.,	It was thought to incentive agroforestry as an alternative to existing farming systems. Also, it was considered to incentive a change of crops. These were thought as alternatives to reduce the expansion of the agriculture frontier. However, it became obvious that these

[1] Parishes Manuel Cornejo Astorga, Aloag, El Chaupi, Palo Quemado, and Las Pampas, and the rural area of Sigchos. These parishes are in the lower basin of the Toachi – Pilatón water system.

Barrier	Project action	Alternative approaches considered but not adopted
	sugar cane and pasture) (output 4).	alternatives will not produce short-term benefits to the local farmers. Since the two most important activities are (i) the production of sugar cane and panela and (ii) cattle ranching, it was decided to better build on the interest of local farmers to improve their production to explore better markets. Sugar cane producers have been exploring forms to have their product certified to enter international markets.
Forest areas are not protected.	Increase the forest cover under conservation (output 1), improve the management of the existing protected forests (output 2), and take measures to trap sediments from eroded hillsides (output 3).	The first idea was to incentive the use of Socio Bosque incentives. However, it was considered that this economic incentive will not necessarily contribute to give value of standing forests and vegetation to the local population (it is the central government which “pays” for conservation). The idea of combining Socio Bosque type incentives and a water fund is being explored. The concept is that water users value the conservation of the water sources and contribute to sustain the fund. The fund in turn, will finance (i) incentives to local land-owners, (ii) the management of the large state-own protected forests, and (iii) complementary measures for soil conservation and the control hill erosion. This is an idea in progress. During project preparation, the feasibility of establishing a water fund will be analysed. The artisanal sediment retention dams is an adaptation measure proposed by the consultants that analysed climate change incidence in priority watersheds of Ecuador. Local groups have arguments in favour and against their use. The feasibility of their use will be analysed during project preparation.

Barrier	Project action	Alternative approaches considered but not adopted
Limited climate-related information	Potentiate meteorological and hydrometric data collection and use (output 5)	The first idea was to use stations that have been installed by HIDROTOAPI. However, it was found that they do not serve to provide watershed-wide information, and are not fully operative. Current ideas are to invest in new equipment for the stations managed by INAMHI. The main limitation is securing funding for their long-term operation and maintenance. The water fund seems a probable source of funding, but its feasibility has to be assessed during project preparation.