



ADAPTATION FUND

AFB/PPRC.13/4
18 October 2013

Adaptation Fund Board
Project and Programme Review Committee
Thirteenth Meeting
Bonn, Germany, 29-30 October 2013

Agenda Item 4 a)

PROPOSAL FOR CHILE

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 42 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 3) 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. 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.

6. 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.

7. 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.

8. The following project concept titled "Enhancing resilience to climate change of the small agriculture in the Chilean region of O'Higgins" was submitted by the *Agencia de Cooperación*

Internacional (AGCI), which is the National Implementing Entity of the Adaptation Fund for Chile. This is the first submission of the project concept document. It was received by the secretariat in time to be considered in the twenty-second Board meeting. The secretariat carried out a technical review of the project proposal, assigned it the diary number CHL/NIE/Agri/2013/1, and completed a review sheet.

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

10. 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. Finally, AGCI has submitted a Project Formulation Grant Request, which is available as an addendum to this document

Project Summary

Chile – Enhancing resilience to climate change of the small agriculture in the Chilean region of O'Higgins

Implementing Entity: AGC/

Project/Programme Execution Cost: USD 810,000

Total Project/Programme Cost: USD 9,170,000

Implementing Fee: USD 800,000

Financing Requested: USD 9,970,000

Project/Programme Background and Context: Chile is vulnerable to climate change with respect to its low-elevation coastal areas, arid and semi-arid areas, afforested areas and areas exposed to deforestation and fragile ecosystems in the Andean and coastal regions.

The objective of the proposed project is to increase the resilience of rural farm communities in the coastal and inner dry lands of the O'Higgins region with respect to current climate variation and future climate changes. This objective will be achieved through the following three components:

Component 1: Increase resilience capacity of rural communities in food and livestock production systems as adaptation measures to climate variability and climate change.

The first component is related to the design and physical implementation of 4 demonstration fields, which consist of systems at the farm level configured for capacity building and transfer of technology by teams of liaison activities in the chosen area. Implementation activities will concentrate on the purchase of machinery, equipment, and hiring of workers for the construction of farm infrastructure; construction and enabling of infrastructure to study and analyze knowledge; and expenses for administration and maintenance of the demonstration centers. The precise location of the pilot sites will be defined during the project implementation. The main criteria for the pilot sites selection is that each one of them will hold a certain area and the sites to be selected will be owned by farmers of the project area and/or will be farms under the Agriculture Investigations Institute (INIA). These sites will not exceed an area of 20 hectares.

Component 2: Improve the agro-meteorological information management in the O'Higgins region.

The second component consists of a work schedule aimed at enhancing the meteorological and agricultural information for the Region of O'Higgins and the best use of this information by the farmers of the project area and the technicians and professionals of local institutions. The generation of capabilities is targeted at public and private professionals in the area. Capacities will be generated in the use of agro-meteorological information. This will increase the skills and improve the capacity of advice to the agricultural producers of the region. The final objective is to improve the decision-making process, made by the farmers. This includes the participation of international experts from the IRI Center of Columbia University, who will take part in technical seminars, courses and workshops who will join a transitional local team. Agro-climatic information will report weather conditions, i.e., meteorological parameters such as temperature, precipitation, solar radiation, direction and wind speed, etc., and some predictive models of incidence of diseases for fruit trees. There is presently a lack of analysis and interpretation of the information that helps to sustain decisions for agricultural issues, in a scientific-technical way, among the farmers and also among the technicians and authorities that work in agriculture.

Component 3: Improve water resources availability on the farm level for rural communities.

The third component aims to generate new water resources and take advantage of them. The main activity comprises the construction of rain harvesting systems. These systems will be constructed over the roof of the houses and barns. They will collect water and direct it through a system of pipes into accumulators. The water generated by the short and intense precipitation events, that take place in winter season, will be storage for future uses.



ADAPTATION FUND

ADAPTATION FUND BOARD SECRETARIAT TECHNICAL REVIEW OF PROJECT/PROGRAMME PROPOSAL

PROJECT/PROGRAMME CATEGORY: Regular-sized Project Concept

Country/Region: **Chile**
 Project Title: **Enhancing resilience to climate change of the small agriculture in the Chilean region of O'Higgins.**
 AF Project ID: **CHL/NIE/Agri/2013/1**
 NEI/MEI Project ID: Requested Financing from Adaptation Fund (US Dollars): **9,700,000**

Reviewer and contact person: **Daniel Gallagher** Co-reviewer(s): **Junu Shrestha**
 NIE/MIE Contact Person: **Enrique O'Farrill-Julien**

Review Criteria	Questions	Comments 12 Sept 2013	Comments 4 Oct 2013
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, Chile is vulnerable to climate change with respect to its low-elevation coastal areas, arid and semi-arid areas, afforested areas and areas exposed to deforestation and fragile ecosystems in the Andean and coastal regions.	
Project Eligibility	1. Has the designated government authority for the Adaptation Fund endorsed the project/programme?	Yes. A letter of endorsement has been received from Chile's Designated Authority, Ms. Gladys Santis, dated August 23, 2013.	

	<p>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?</p>	<p>The proposed project represents an opportunity to address the adaptation needs of agricultural smallholders and subsistence farmers by focusing on adaptation measures in the geographical area of O'Higgins, where such farmers are particularly climate vulnerable. The approach to pilot demonstration sites for improved wheat and corn cultivation, together with improved cattle and grazing strategies, whilst also improving meteorological information and water resource management does, in principle, have potential to fulfil the objective of increasing the climate resilience of rural farm communities in the target area. However, the scope and justification of a number of the project activities, as well as the methodology behind such an approach, requires further elaboration.</p> <p>The first component of the proposed project seeks to establish a dedicated professional team of extension workers to manage the development of demonstration fields off-farm and on-farm. The knowledge created from such demonstration fields is planned to be shared with farmers and rural communities.</p>	
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		<p>However, the extent to which the present agricultural practices are unsustainable in the project sites is unclear. This information would help in assessing whether the proposed approach would be adequate in maintaining productivity in the face of a changing climate. Furthermore, the project activities responding to the climate vulnerability of smallholders need to be further elaborated at this stage.</p> <p>CR1: Please clarify the main use of land in the pilot sites and the expected climate change vulnerabilities with respect to land use.</p> <p>CR2: Please provide further detail on all activities under Component 1, so that their appropriateness in responding to the climate risks can be assessed. In doing so, please identify the potential agro-technologies that would be used, elaborate further on what the technology packages for tolerant varieties may include, and clarify whether the project will develop tolerant crop varieties or focus on the deployment of already developed crops.</p>	<p>CR1: Not addressed.</p> <p>The proposal should clearly articulate the expected climate change effects on pastures, meadows, new forested plantations and crop production practice in the area in order that the appropriateness of the adaptation measures can be assessed.</p> <p>CR2: Addressed.</p> <p>Information on the modification of planting patterns, introduction of new varieties and tillage practices are described and their appropriateness justified.</p>
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		<p>CR3: Component 3 focuses on improving water availability on the farm level, but it is not clear what scale (i.e storage capacity per unit) or extent (i.e. how many farms) this is planned on. Given that precipitation is expected to decrease in future, please consider implications on recharge of surface and ground water due to the project activities. Please also consider and clarify the sufficiency of rainwater in meeting the agricultural demands of the project sites. As the proposal suggests there are pressures on over-extraction of surface and ground-water, the proponent may wish to consider improvement of such systems.</p> <p>CR4: Please clarify the proposed scale and number of demonstration fields dedicated to the improvement of wheat and corn cultivation, and cattle rearing. Please also clarify the number of farmers that will directly have access to these demonstration fields and – beyond knowledge sharing – how these farmers will benefit concretely and directly from these fields.</p>	<p>CR3: Partially addressed.</p> <p>Information is provided on the scale of proposed rainwater harvesting activities, but it remains unclear how these practices will be a significant adaptation measure for the area. The proposal should provide information on the practices that smallholder farmers currently rely on in irrigating the farms, to allow an assessment of the appropriateness of using water harvesting schemes to achieve the adaptation goals.</p> <p>CR4: Partially addressed.</p> <p>The project intends to support four demonstration sites of less than 20ha. However, it remains unclear how farmers will benefit concretely and directly from these demonstration fields.</p>
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		<p>CR5: Please provide an outline of the methodology that the teams of extension workers will use to ensure that smallholder farmers benefit concretely and directly on their farms from the proposed demonstration activities in the first component.</p> <p>As it is currently formulated, the project benefits are largely framed around delivering “improve(d) yields and livestock productivity” (p25). However, the proposal identifies that the precariousness of the smallholder agricultural sector extends beyond considerations of yield and productivity alone. For example, only 4 per cent of all farmers are linked to export markets, 3 per cent to agro-industries, and 94 per cent do not belong to an organisation. Considering these factors, as well as the fact that the uptake of support measures such as technical assistance and agricultural insurance has, to date, been low, the project should consider further opportunities to build the climate resilience of agricultural communities.</p>	<p>CR5: Not addressed.</p> <p>Some information is provided on the dissemination of best practices. However, providing advice and information alone does not demonstrate an effective methodology to ensure the effective deployment of adapted farming techniques. The proposal should ensure that smallholder farmers have access to the resources needed to invest in adapted farming techniques, and clarify how they will benefit concretely and directly on their farms from the proposed demonstration activities in the first component.</p>
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		<p>CR6: Please outline and appraise the opportunities for building climate resilience that exist throughout the agricultural value chain, beyond sustaining or increasing yield and livestock productivity alone and extending to involvement of smallholder farmers in domestic and international markets. If this aspect is covered by other on-going or planned interventions, please describe potential synergies. If the proposed project does not seek to support opportunities for building climate resilience for smallholder farmers through greater involvement in the agricultural value chain and markets, please justify why not.</p> <p>The second component, which seeks to enhance the meteorological and agricultural information provided to farmers and professionals, is not described in sufficient detail to ascertain its implications, in practical terms, for farmers.</p> <p>CR7: Please clarify how the proposed project envisions that smallholder farmers will benefit from improvements in GIS systems and the development of</p>	<p>CR6: Partially addressed.</p> <p>The proposal does not include an appraisal of opportunities for building climate resilience that exist throughout the agricultural value chain, but indicates that the dimension of markets is covered elsewhere in government programs e.g. INDAP and Productive Partnership Program – Ministry of Agriculture. The proposal should seek to build synergies with these existing initiatives to ensure that measures to address the adaptation needs of smallholder farmers are holistic and go beyond production and yield alone.</p> <p>CR7: Partially addressed.</p> <p>The need for local and regional scale climate related information that is pre-analysed in a manner</p>
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		<p>an observatory. Specifically, the methodology that will be used to communicate relevant and timely information to smallholder farmers should be described, as well as how this information will influence their decision-making with respect to climate variability and change. Information on the existing national and sub-national capacities for agro-climatic information should be provided.</p>	<p>useful for the farmers is understood. However, it is not clear how the project will accomplish such a task. The proposal should explain how the project intends to collect, analyze and disseminate climatic information that will be directly relevant to smallholder and subsistence farmers in a timely manner. In doing so, the proposal should make clear who will be involved in operating the observatory and what its concrete outputs will be.</p>
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	<p>3. Does the project / programme provide economic, social and environmental benefits, particularly to vulnerable communities, including gender considerations?</p>	<p>The project activities have potential to provide multiple benefits to vulnerable smallholder and subsistence farmers. However, despite providing comprehensive background information on the differing adaptation needs according to gender, the project benefits have not been clearly articulated in a similar manner at this stage.</p> <p>CR8: Please fully articulate the economic, social and environmental benefits of the proposed project for smallholder and subsistence farmers, as well as any other beneficiaries, with particular consideration to gender in the target areas. It is expected that the project results will directly benefit the smallholder farmers and not simply through knowledge dissemination. Please describe the intended effect that the proposed activities will have on social and economic wellbeing in the target beneficiaries. Additionally, comments should address any potential environmental impact of extensive sheep grazing on pasturelands, and how the proposed project will avoid any negative impacts associated with this activity.</p>	<p>CR8: Not addressed.</p> <p>Information on the historical perspective of soil erosion is provided. However, the proposal does not make clear how climate change will worsen this condition and how it will devise measures to reduce erosion. Explicit connections should be made between the expected climate impact on erosion in the project area, the proposed measures and their expected adaptation benefits.</p>
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		<p>CR9: Please clarify if the project intends to deliver benefits to beneficiaries in a manner such that individual smallholder farmers benefit from each and every component, or whether each component is targeted towards different segments of population.</p>	<p>CR9: Partially addressed.</p> <p>It seems that different components target different sectors of the population, though this is not stated explicitly in the project document.</p>
	4. Is the project / programme cost effective?	<p>An adequate demonstration of cost-effectiveness is not provided in the concept proposal.</p> <p>CR10: Please demonstrate how the selected approach and activities in the O'Higgins area represents a cost effective use of the Adaptation Fund's resources in Chile. In doing so, please consider justifying the choice of such an approach against the other alternative options that were considered.</p>	<p>CR10: Addressed.</p> <p>Cost-effectiveness has been considered and some justification has been provided against alternatives.</p>
	5. Is the project / programme consistent with national or sub-national sustainable development strategies, national or sub-national development plans, poverty reduction strategies, national communications and adaptation programs of action and other relevant instruments?	<p>Yes, the proposed project represents a first step in operationalizing the Climate Change Adaptation Plan for Forestry and Agriculture, which follows on from the earlier development of an action plan initiated in 2008. Additionally, Chile's second national communication to the UNFCCC highlights the national focus on the water sector, as well as agricultural, forestry and livestock.</p>	

	<p>6. Does the project / programme meet the relevant national technical standards, where applicable?</p>	<p>The proposal makes mention of the provisions in Chile for conducting environmental assessments, but does not state whether the activities in the proposed project would be of a scale that would require seeking compliance with such provisions.</p> <p>CR11: Please state whether the activities in the proposed project would be of a scale or extent that would require seeking compliance with relevant laws through obtaining a statement of environmental impacts. If so, please identify the particular activities that would require such a statement and how these activities would be designed to comply with the relevant laws.</p>	<p>CR11: Addressed.</p> <p>The project does not have to present an evaluation nor declaration of environmental impact.</p>
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	7. Is there duplication of project / programme with other funding sources?	<p>The proposal makes mention of earlier initiatives in the target region that created experiences in agricultural emergencies and resilience for agricultural systems, but does not state how it will seek to build synergies with such initiatives. Secondly, there are existing initiatives in support means for agricultural production (including technical assistance, best practices and agricultural insurance schemes) in the target area that have had low uptake.</p> <p>CR12: Please provide a brief discussion on the aspects of related interventions that have been taken into account in the formulation of the present proposal, paying particular attention to how the low uptake of previous and existing initiatives will be overcome in this project.</p>	CR12: Not addressed.
	8. Does the project / programme have a learning and knowledge management component to capture and feedback lessons?	<p>Unclear at this stage.</p> <p>CR13: Please clarify how a learning and knowledge management component, or subcomponent, has been included in the project to capture and feedback lessons.</p>	CR13: Not addressed.

	<p>9. Has a consultative process taken place, and has it involved all key stakeholders, and vulnerable groups, including gender considerations?</p>	<p>The proposal states that earlier consultations for the elaboration of the Climate Change Action Plan have served as reference for the formulation of the present proposal. It is unclear, however, if any initial consultation has taken place with stakeholders on the specific proposed project being presently considered.</p> <p>CR14: Please provide an overview of the initial consultative process that has taken place for the development of the proposed project, including a list of stakeholders consulted.</p>	<p>CR14: Addressed.</p>
	<p>10. Is the requested financing justified on the basis of full cost of adaptation reasoning?</p>	<p>Yes</p>	
	<p>11. Is the project / program aligned with AF's results framework?</p>	<p>Unclear.</p> <p>CR15: Please state how the proposed project is aligned with the Adaptation Fund results framework.</p>	<p>CR15: Addressed.</p>
	<p>12. Has the sustainability of the project/programme outcomes been taken into account when designing the project?</p>	<p>The sustainability of the outcomes of the proposed project is to a large degree predicated on the assumption of increased capacity of farmers and local institutions. However, it is not clear how the new network of extension workers will be sustained financially and to what degree, and on what extent, they will continue to support</p>	

		<p>farming communities after project completion. The sustainability of the project depends on the involvement of the local communities, and them receiving direct and concrete benefits. The project needs to further clarify these issues.</p> <p>CR16: Please clarify how the new network of extension workers will be sustained financially after project completion. In doing so, please detail the role and objective of the network in the longer term, the extent to which it will continue to support farming communities, and how its work will sustain the climate resilience built through this project.</p> <p>CR17: Please discuss how the long-term maintenance of rainwater harvesting installations has been considered, with a view to ensuring their sustainable long-term operation. In doing so, please draw reference from their previous use in the target area, or a similar context, if possible.</p> <p>CR18: Please provide a summary of ongoing external or governmental initiatives in the region or nationally that may have implications on the sustainability</p>	<p>CR16: Not addressed.</p> <p>A response has been provided but not integrated in the revised project document.</p> <p>CR17: Not addressed.</p> <p>A response has been provided but not integrated in the revised project document.</p> <p>CR18: Addressed.</p>
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		of the proposed project.	
Resource Availability	1. Is the requested project / programme funding within the cap of the country?	No. The requested project funding and the Project Formulation Grant together amount to US\$ 10.03 million, exceeding the cap. The following request for corrective action is made: CAR1: Please reduce the overall funding request to a maximum of US\$ 10 million.	CAR1: Mostly addressed. A reference remains on the front cover to US\$ 10 million, though the project financing section has reduced it to US\$ 9.97 million.
	2. Is the Implementing Entity Management Fee at or below 8.5 per cent of the total project/programme budget before the fee?	No. CAR2: Please reduce the Implementing Entity Management fee to be within 8.5 per cent of the total project budget.	CAR2: Not addressed. Fee is 8.7 per cent.
	3. Are the Project/Programme Execution Costs at or below 9.5 per cent of the total project/programme budget (including the fee)?	Yes.	
Eligibility of NIE/MIE	4. Is the project/programme submitted through an eligible NIE/MIE that has been accredited by the Board?	Yes, AGCI is an accredited NIE of the Adaptation Fund	
Implementation Arrangement	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. Is a budget on the Implementing Entity Management Fee use included?	N/A	
	4. Is an explanation and a breakdown of the execution costs included?	N/A	
	5. Is a detailed budget including budget notes included?	N/A	
	6. Are arrangements for monitoring and evaluation clearly defined, including budgeted M&E plans and sex-disaggregated data, targets and indicators?	N/A	
	7. 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	
	8. 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	
	9. Is a disbursement schedule with time-bound milestones included?	N/A	

Technical Summary	<p>The proposed project represents an opportunity to address the adaptation needs of agricultural smallholders and subsistence farmers by focusing on adaptation measures in the geographical area of O'Higgins, where such farmers are particularly climate vulnerable. The initial technical review found that the approach to pilot demonstration sites for improved wheat and corn cultivation, together with improved cattle and grazing strategies, whilst also improving meteorological information and water resource management could, in principle, have potential to fulfil the objective of increasing the climate resilience of rural farm communities in the target area.</p> <p>However, the scope and justification of a number of the project activities, as well as the methodology behind its approach, required further elaboration.</p> <p>The following 18 clarification requests (CR) were sought from the project proponent:</p>
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CR1: Please clarify the main use of land in the pilot sites and the expected climate change vulnerabilities with respect to land use.

CR2: Please provide further detail on all activities under Component 1, so that their appropriateness in responding to the climate risks can be assessed. In doing so, please identify the potential agro-technologies that would be used, elaborate further on what the technology packages for tolerant varieties may include, and clarify whether the project will develop tolerant crop varieties or focus on the deployment of already developed crops. Please also reconsider whether the rainwater harvesting proposed in Component 3 is appropriate for application to agricultural needs, given the large surface area and storage volume that would be required for such an application.

CR3: Component 3 focuses on improving water availability on the farm level, but it is not clear what scale (i.e. storage capacity per unit) or extent (i.e. how many farms) this is planned on. Given that precipitation is expected to decrease in future, please consider implications on recharge of surface and ground water due to the project activities. Please also consider and clarify the sufficiency of rainwater in meeting the agricultural demands of the project sites. As the proposal suggests there are pressures on over-extraction of surface and ground-water, the proponent may wish to consider improvement of such systems.

CR4: Please clarify the proposed scale and number of demonstration fields dedicated to the improvement of wheat and corn cultivation, and cattle rearing. Please also clarify the number of farmers that will directly have access to these demonstration fields and – beyond knowledge sharing – how these farmers will benefit concretely and directly from these fields.

CR5: Please provide an outline of the methodology that the teams of extension workers will use to ensure that smallholder farmers benefit concretely and directly on their farms from the proposed demonstration activities in the first component.

CR6: Please outline and appraise the opportunities for building climate resilience that exist throughout the agricultural value chain, beyond sustaining or increasing yield and livestock productivity alone and extending to involvement of smallholder farmers in domestic and international markets. If this aspect is covered by other on-going or planned interventions, please describe potential synergies. If the proposed project does not seek to support opportunities for building climate resilience for smallholder farmers through greater involvement in the agricultural value chain and markets, please justify why not.

CR7: Please clarify how the proposed project envisions that smallholder farmers will benefit from improvements in GIS systems and the development of an observatory. Specifically, the methodology that will be used to

communicate relevant and timely information to smallholder farmers should be described, as well as how this information will influence their decision-making with respect to climate variability and change. Information on the existing national and sub-national capacities for agro-climatic information should be provided.

CR8: Please fully articulate the economic, social and environmental benefits of the proposed project for smallholder and subsistence farmers, as well as any other beneficiaries, with particular consideration to gender in the target areas. It is expected that the project results will directly benefit the smallholder farmers and not simply through knowledge dissemination. Please describe the intended effect that the proposed activities will have on social and economic wellbeing in the target beneficiaries. Additionally, comments should address any potential environmental impact of extensive sheep grazing on pasturelands, and how the proposed project will avoid any negative impacts associated with this activity.

CR9: Please clarify if the project intends to deliver benefits to beneficiaries in a manner such that individual smallholder farmers benefit from each and every component, or whether each component is targeted towards different segments of population.

CR10: Please demonstrate how the selected approach and activities in the O'Higgins area represents a cost effective use of the Adaptation Fund's resources in Chile. In doing so, please consider justifying the choice of such an approach against the other alternative options that were considered.

CR11: Please state whether the activities in the proposed project would be of a scale or extent that would require seeking compliance with relevant laws through obtaining a statement of environmental impacts. If so, please identify the particular activities that would require such a statement and how these activities would be designed to comply with the relevant laws.

CR12: Please provide a brief discussion on the aspects of related interventions that have been taken into account in the formulation of the present proposal, paying particular attention to how the low uptake of previous and existing initiatives will be overcome in this project.

CR13: Please clarify how a learning and knowledge management component, or subcomponent, has been included in the project to capture and feedback lessons.

CR14: Please provide an overview of the initial consultative process that has taken place for the development of the proposed project, including a list of stakeholders consulted.

CR15: Please state how the proposed project is aligned with the Adaptation Fund results framework.

CR16: Please clarify how the new network of extension workers will be sustained financially after project completion. In doing so, please detail the role and objective of the network in the longer term, the extent to which it will continue to support farming communities, and how its work will sustain the climate resilience built through this project.

CR17: Please discuss how the long-term maintenance of rainwater harvesting installations has been considered, with a view to ensuring their sustainable long-term operation. In doing so, please draw reference from their previous use in the target area, or a similar context, if possible.

CR18: Please provide a summary of on-going external or governmental initiatives in the region or nationally that may have implications on the sustainability of the proposed project.

In addition, two Corrective Action Requests (CARs) were made:

CAR1: Please reduce the overall funding request to a maximum of US\$ 10 million.

CAR2: Please reduce the Implementing Entity Management fee to be within 8.5 per cent of the total project budget.

The final technical review finds that, despite providing some additional information, the revised proposal has not satisfactorily addressed the clarification requests and corrective action requests. The following observations are made:

- i. The proposal should clearly articulate the expected climate change effects on pastures, meadows, new forested plantations and crop production practice in the area in order that the appropriateness of the adaptation measures can be assessed.
- ii. The proposal should provide information on the practices that smallholder farmers currently rely on in irrigating the farms, to allow an assessment of the appropriateness of using water harvesting schemes to achieve the adaptation goals.
- iii. The proposal should ensure that smallholder farmers have access to the resources needed to invest in adapted farming techniques, and clarify how they will benefit concretely and directly on their farms from the proposed demonstration activities in the first component.

- iv. The proposal should seek to build synergies with existing initiatives covering market dimensions to ensure that measures to address the adaptation needs of smallholder farmers are holistic, and go beyond production and yield alone.
- v. The proposal should explain how the project intends to collect, analyse and disseminate climatic information that will be directly relevant to smallholder and subsistence farmers in a timely manner. In doing so, the proposal should make clear who will be involved in operating the observatory and what its concrete outputs will be.
- vi. The proposal should make clear how climate change will worsen historical problems of soil erosion, making explicit connections between the expected climate impact on erosion in the project area, the measures considered and prioritised to combat this problem, and the expected adaptation benefits of the chosen measures.
- vii. The proposal should discuss the aspects of related interventions that have been taken into account, paying particular attention to how the low uptake of previous and existing initiatives will be overcome in this project.
- viii. The proposal should clarify how a learning and knowledge management component, or subcomponent, has been included in the project to capture and feedback lessons.
- ix. The proposal should clarify how the new network of extension workers will be sustained financially after project completion. It should detail the role and objective of the network in the long term, the extent to which it will continue to support farming communities, and how its work will sustain the climate resilience built through this project.
- x. The proposal should discuss how the long-term maintenance of rainwater harvesting installations has been considered, with a view to ensuring their sustainable long-term operation. In doing so, please draw reference from their previous use in the target area, or a similar context, if possible.
- xi. The proposal should reduce the requested Implementing Entity management fee to be within the cap of 8.5 per cent, as well as ensure the requested total financing is reported consistently throughout.

Date:

4 October 2013



ADAPTATION FUND

REQUEST FOR PROJECT/PROGRAMME FUNDING FROM ADAPTATION FUND

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

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

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

Complete documentation should be sent to

The Adaptation Fund Board Secretariat
Email: secretariat@adaptation-fund.org

ACRONYMS

AGCI	Agencia de Cooperación Internacional	International Cooperation Agency
DGA	Dirección General de Aguas	General Directorate of Water
CNR	Comisión Nacional de Riego	National Commission for Irrigation
CONAF	Corporación Nacional Forestal	Forestry National Corporation
CONAMA	Comisión Nacional del Medio Ambiente	National Commission for Environment
ECLAC	Latin America and the Caribbean Commission	Comisión Económica para América Latina y El Caribe
ENSO	El Niño Southern Oscillation	El Niño Oscilación Sur
FAO	Food and Agriculture Organization	Organización de las Naciones Unidas para la Alimentación y la Agricultura
FIA	Fundación para la Innovación Agraria	Foundation for Agricultural Innovation
INDAP	Instituto de Desarrollo Agropecuario	Institute for Agriculture

		Development
INIA	Instituto de Investigaciones Agropecuarias	Agriculture Research Institute
INE	Instituto Nacional de Estadísticas	National Institute of Statistics
IPCC	Intergovernmental Panel on Climate Change	Panel Intergubernamental de Cambio Climático
MIDEPLAN	Ministerio de Planificación (Hoy Ministerio de Desarrollo Social)	Ministry of Planning
MINAGRI	Ministerio de Agricultura	Ministry of Agriculture
MMA	Ministerio del Medio Ambiente	Ministry of Environment
ODEPA	Oficina de Estudios y Políticas Agrarias	Agricultural Policies and Studies Office
PNUD	Programa de las Naciones Unidas para el Desarrollo	United Nations Development Program
SAG	Servicio Agrícola y Ganadero	Agriculture and Livestock Service
UNFCCC	United Nations Framework Convention on Climate Change	Convención Marco de las Naciones Unidas sobre Cambio Climático.



PROJECT/PROGRAMME PROPOSAL

■ PART I: PROJECT/PROGRAMME INFORMATION

PROJECT/PROGRAMME CATEGORY: **REGULAR PROJECT / PROGRAMME**
COUNTRY/IES: **CHILE**
SECTOR/S: **AGRICULTURE, LIVESTOCK AND FORESTRY, WATER RESOURCES**

TITLE OF PROJECT/PROGRAMME: **ENHANCING RESILIENCE TO CLIMATE CHANGE OF THE SMALL AGRICULTURE IN THE CHILEAN REGION OF O'HIGGINS.**

TYPE OF IMPLEMENTING ENTITY: **NIE**
IMPLEMENTING ENTITY: **AGENCIA DE COOPERACIÓN INTERNACIONAL (AGCI)**
EXECUTING ENTITY/IES: **MINISTRY OF AGRICULTURE; MINISTRY OF ENVIRONMENT**

AMOUNT OF FINANCING REQUESTED: **10 MILL** (In U.S Dollars Equivalent)

■ PROJECT / PROGRAMME BACKGROUND AND CONTEXT:

Provide brief information on the problem the proposed project/programme is aiming to solve. Outline relevant climate change scenarios according to best available scientific information. Outline the economic social, development and environmental context in which the project/programme would operate.

Chile: national circumstances.

Chile is a tri-continental country with territory that extends along the southwest portion of South America and includes Easter Island in Oceania as well as part of Antarctica to the south. Continental Chile is located between 17° 30' and 56° 30' Latitude South, while Chile's Antarctic Territory covers the area between 53° and 90° Longitude West and the South Pole. It is bordered by the Pacific Ocean along 8,000 kilometres of coastline.

In general terms, Chile has a temperate climate. Due to some variations caused mainly by differences in latitude and altitude, it give rise to desert, tropical, mediterranean, temperate, and polar climates, among others. Ecologically, the presence of biodiversity and specific plant formations in a given zone depends on the existing climate.

On the other hand, Chile's population grew quickly in the 20th Century, but growth has slowed in the past decade and is expected to decelerate even more towards the middle of the 21st Century. The total population was last recorded at 17.4 million people in 2012 from 7.7 million in 1960, changing 127 % , during the last 50 years.

The country's development has improved the quality of life of its inhabitants, and in 2010 Chile ranked 45th globally in the United Nations Human Development Index. Since 1990, Chile has experienced rapid economic growth and diversification and increased its reliance on exports. These developments can be explained by the country's stable government, political institutions capable of generating and maintaining consensus on key issues, and effective public policies.

Chilean climate change policies and plans

Under the UNFCCC criteria (article 4, No 8), Chile has to be considered as a country vulnerable to climate change with respect to its: low-elevation coastal areas, arid and semi-arid areas, afforested areas and areas exposed to deforestation and fragile ecosystems in the Andean and coastal regions.

In 2008 the Chilean government adopted the "National Action Plan on Climate Change" as the strategic guideline for policy planning and implementation with respect to climate adaptation and mitigation issues. The action plan, among others, stipulates the elaboration of adaptation plans for seven key sectors, including the forestry and agriculture sector.

The adaptation plan for this sector has been co-developed by the Ministry of Agriculture and the Climate Change Office of the Ministry of Environment during 2012 and has been officially approved by both Ministries in May 2013. The plan involves 21 adaptation measures several of them are addressed to the poorest and the most vulnerable groups in this sector.

The development of the Climate Change Adaptation Plan for Forestry and Agriculture, as a result of the implementation of the National Climate Change Action Plan 2008-2012, was an opportunity for the Services under the Ministry of Agriculture to participate in a joint work, through the establishment of a technical group of professionals, which elaborated a proposal of the plan.

This sectorial plan has been politically supported and has passed through a consultation process with citizens and is a pioneer action among the other sectors. All its actions have political support. All the components of the proposed project correspond to real actions among those proposed in the Climate Change Adaptation Plan for Forestry and Agriculture.

As an implementation strategy for this sectorial plan, the technical workgroups on climate change of the two ministries have identified a series of concrete actions as a "first step" towards the gradual implementation of the whole plan, which financing through the Adaptation Fund of the United Nations Framework Convention on Climate Change (UNFCCC) is subject of this request.

Climate change impacts in Chile

In its second national communication to the UNFCCC (2011) the Chilean government highlighted the vulnerability of a variety of sectors to the expected future climate scenarios (Fig.1). These scenarios (generated with HadCM3+PRECIS) suggest changes in temperature and precipitation patterns from south to north and from the coast to the Andes:

- Temperature rises are expected between 1°C and 3°C in a moderate scenario (B2) and between 2°C and 4°C in a severe scenario (A2) across the country, at the end of the century.
- Rainfall patterns will change from north to south, resulting in water shortage especially in the central part of the country where 70% of the total population is living and in water abundance in the extreme southern part of Chile.
- Glaciers, which act as strategic water reserves, will continue to retreat.
- Snow storage capacity in the mountain areas will decrease because the increasing temperature will shift the snow-line to higher altitudes.

Rising temperature and changes in precipitation in addition to soil erosion due to storms and desertification processes, will impact strongly in the productivity of the agriculture, forestry and livestock sector and driving changes in land use patterns along the country. For most of the country, losses in productivity of annual crops are to be expected, especially for non-irrigated lands and also in regions with irrigation restrictions, due to water shortage. Also losses in productivity of vineyards are to be expected in the actual cultivated area, located in the northern and central parts of Chile, due to both, restrictions in water supply and the reduction of the fruit development period caused by higher temperatures.

Regarding pastures and livestock, the seasonality for both the sheep and bovine cattle production is expected to change, depending on the geographical area. On the other hand, forestall plantation production of *Pinus radiata*, is projected to decrease in the northern and central areas and to improve its potential of production from the Araucanía Region to the southern areas of the country.

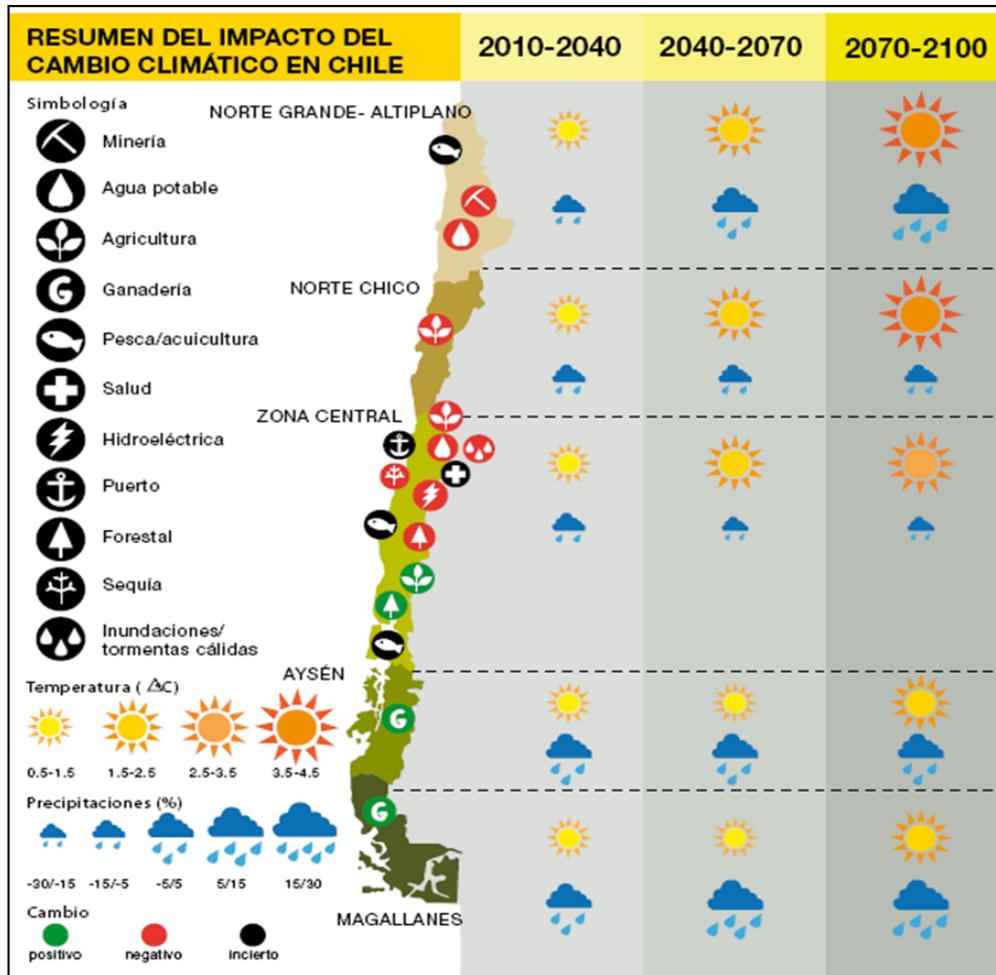


Fig. 1: Summary of climate change impacts on Chile for the period 2010-2100. Second national communication to the United Nations Framework Convention on Climate Change (2011)

● Positive ● Negative ● Uncertain

Agricultural groups and regions most vulnerable to climate change

It is especially the central part of Chile (29 deg. SL-34 deg.SL) , in which most of the population is living, where adaptation actions are needed to avoid or minimize negative climate impacts which threatens agriculture productivity and livelihood at both ends of the socioeconomic scale.

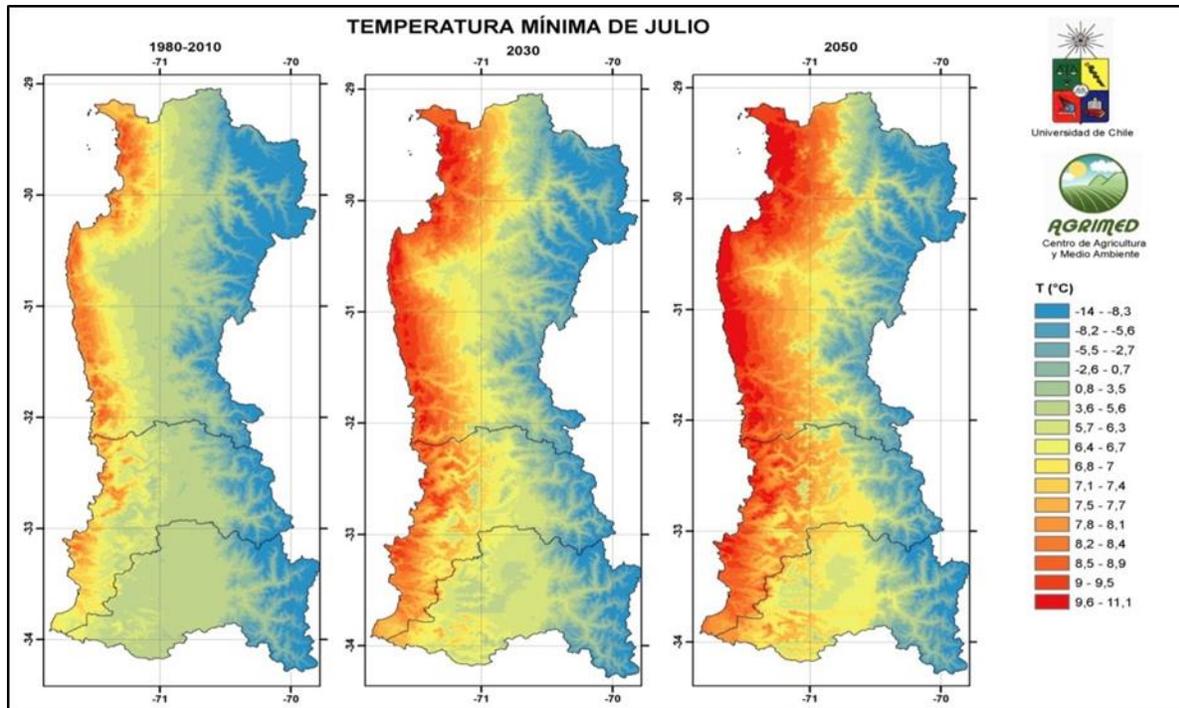


Fig 2: Projections of changes in minimum temperature (during July) and annual precipitation for central Chile; AGRIMED (2013)

Studies¹ (AGRIMED & ASAGRIN, 2011; AGRIMED, 2013; Fig. 2) suggest that the combination of rising temperatures and precipitation decline in this area will increase the process of desertification and soil erosion together with prolonged droughts and heat stress on traditional crops and livestock.

A field study, carried out in 2011 by AGRIMED & ASAGRIN, analysed climate change vulnerability of 20 different agricultural groups from the Aymara population in the north of Chile to the cattle farmers in the Patagonian pampa in the south. Their total vulnerability to potential climate change impacts has been estimated as the sum of 6 specific impacts, caused by: (i) soil erosion, (ii) water shortage in dry areas, (iii) water shortage in irrigated areas, (iv) plagues and diseases, (v) crop development (plant phenology) and (vi) heat stress on crops and livestock.

The results of this survey (Tab.1) show that the most vulnerable groups are: (i) farmers in the dry areas of central Chile between the regions of Valparaíso and Biobío, farmers in the transversal valleys of the regions of Atacama and Coquimbo and the extensive cattle farmers in the dray areas of central Chile (Fig.3). For all these groups, water

¹ - Portafolio de propuestas para el programa de adaptación del sector silvoagropecuario al cambio climático en Chile, 2011. Centro de Agricultura y Medio Ambiente de la Universidad de Chile (AGRIMED), Gestión de Agronegocios (ASAGRIN), Santiago.

- Plan de acción para la protección y conservación de la biodiversidad, en un contexto de adaptación al Cambio Climático, 2013. Centro de Agricultura y Medio Ambiente de la Universidad de Chile (AGRIMED), Santiago.

availability and management has been identified as the key issue related to climate threats, followed by heat stress on crops and livestock.

N°	Farmer communities or locations	Soil erosion	Water shortage drylands	Water shortage irrigated	Plagues, diseases	Crop development	Heat stress	TOTAL
1	Andean valleys	4	0	2	2	3	4	15
2	Aymara farmers of the Atacama region	2	0	0	2	1	0	5
3	Irrigated dessert valleys	2	0	2	5	4	5	18
4	Andean areas of Limarí, Petorca and Maipo	3	0	5	4	4	5	21
5	Transversal valleys	3	4	0	1	4	3	15
6	Extensive cattle farmers in drylands	4	5	4	3	2	3	21
7	Coastal drylands; regions V,VIII **	5	5	0	4	4	2	20
8	Drylands; regions V,VIII **	5	5	0	4	4	5	23
9	Fruit farming; annual plants; regions V,VII	1	0	4	4	3	5	17
10	Fruit farming; perennial plants; regions V,VII	1	0	4	4	3	1	13
11	Grain producers; regions VI,VIII	2	0	4	3	3	4	16
12	Vegetable producers; regions V and Metropolitan	2	0	3	3	3	3	14
13	Winegrowing; regions VI,VIII	1	0	4	4	3	4	16
14	Pre-andean drylands	0	0	0	0	0	0	0
15	Forestry; regions VI,X	4	3	0	2	0	3	12
16	Non irrigated coastal areas, regions IX,X	3	3	0	2	2	1	11
17	Non irrigated areas, regions IX,X	4	4	0	3	2	2	15
18	Farmers at the Chiloé island	4	3	0	2	2	1	12
19	Andean areas in the regions X and XI	2	1	3	1	1	1	9
20	Cattle farmers, Patagonian pampa and Fireland	4	1	0	1	0	0	6
	TOTAL	56	34	35	54	48	52	

** In this regions the project area will be located.

Table 1: Vulnerability to climate change for 20 agricultural groups in Chile (AGRIMED& ASAGRIN, 2011)
The values refer to scale from "0" (no threat) to "5" (very high threat)

The results of an opinion survey, carried out by the Ministries of Agriculture and Environment in 8 Chilean regions in the context of the public consultation process ("Consulta Ciudadana") of the Adaptation Plan for forestry and agriculture in 2012, showed that most of the proposed actions which have been identified by local agricultural groups as the first step in the implementation of the adaptation plan, are related to water supply and management.

Arrangements of the State in Forestry and Agriculture

The Ministry of Agriculture is the State Institution responsible for promoting, guiding and coordinating the agroforestry activity in the country. According to the Decree Law 294 of 1960, "its action is aimed, primarily, to obtain the increase in national production, the conservation, protection and enhancement of the nutritional conditions of the people". The following services are under the Ministry of Agriculture: Agricultural Policies and Studies Office (ODEPA); Institute for Agriculture Development (INDAP); Agriculture and

Livestock Service (SAG); Forestry National Corporation (CONAF); Agriculture Research Institute (INIA); National Commission for Irrigation (CNR); Institute of Forestry (INFOR); Center for Research of Natural Resources (CIREN); Foundation for Communications for Agro (FUCOA); Foundation for Agricultural Innovation (FIA).

To efficiently promote the development of the sector, the Ministry of Agriculture acts in different areas: Government; research and technology transfer, services. These actions is coordinated through the Undersecretary of Agriculture, at national level and through its services, led by the Regional Ministerial Secretary (SEREMI), at the territory level. The SEREMI coordinates the respective heads of service in the region.

The main Service responsible for the promotion of production, with an important distribution at a local level is INDAP, which is structured in divisions, each of them bring together one or more commune. They depend on the Regional Directorates and the Regional Directorate depends on the central level.

The actions of INDAP are restricted by law to a certain profile of agricultural producer. These actions can be gathered in: financing via transfers; technical advice (which highlights the Local Development Programme “PRODESAL”, with commune coverage and that is established in coordination with the municipalities); advice in productive chain (highlights The Productive Partnership Programme that seeks to establish trade links at a local level between producers and agribusiness) and finally land investment focused on infrastructure, irrigation and soil conservation works.

Proposed project area

Based on the findings before mentioned and complementary studies carried out by the services of the Ministry of Agriculture (INIA, SAG, INDAP, CNR, FIA, ODEPA, CONAF) and with the aim to include a variety of agriculture groups, the region of Libertador General Bernardo O’Higgins (“O’Higgins”) in the centre of Chile has been chosen for the implementation of the adaptations measures described in detail in the following paragraph.

The region of O’Higgins includes both, irrigated and non-irrigated agricultural systems managed on an intensive or extensive level either by small scale farmers or by to export oriented ones. The Ministry of Agriculture counts in this region with a network of services and already established activities related to capacity building, agro- technology transfer and to climate change related research. We can therefore assume that the implementation of the climate change adaptation measures described in the following paragraph are meeting the very needs of that region and will be carried out in a management, evaluation and monitoring appropriate environment.

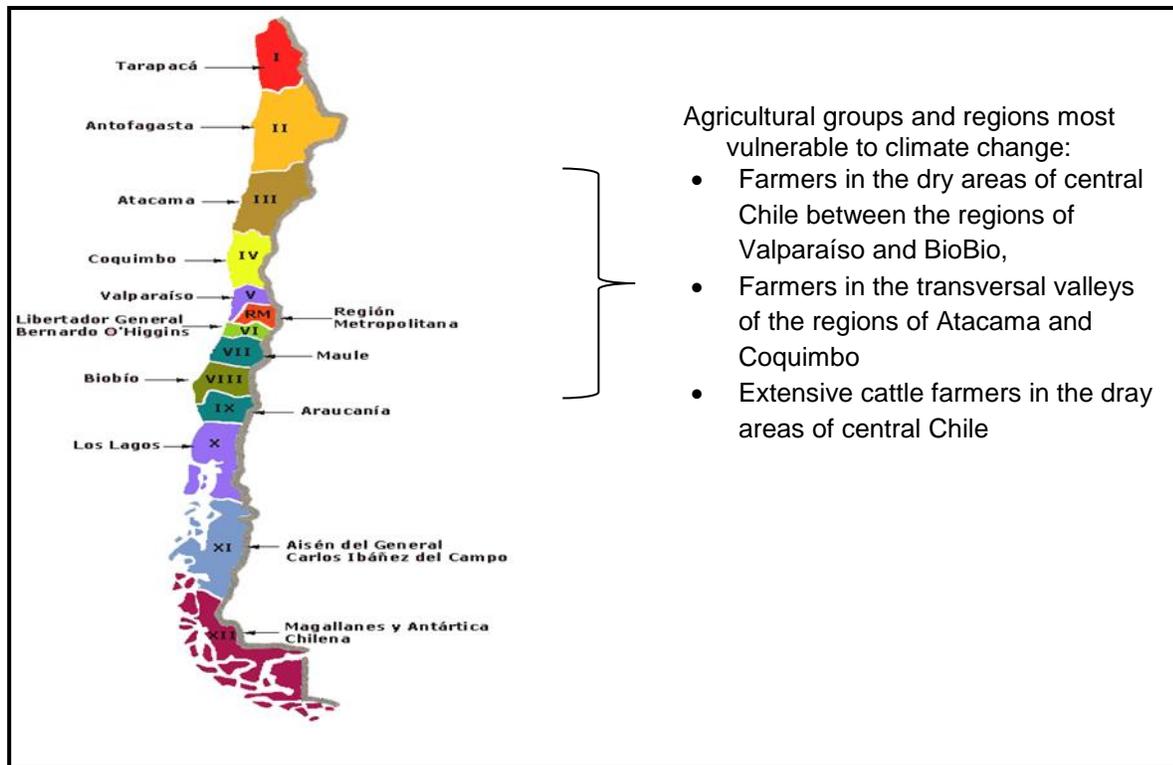


Fig 3: Regions and agricultural groups most vulnerable to climate change

Social economic and agricultural characteristics of the proposed area

This region (33°51' – 35°01' SL) includes 33 communes. Eight of those are located at the project area: Paredones, Pichilemu, Marchihue, La Estrella, Litueche y Navidad, Lolol y Pumanque (figure 4).

Considering the current climate, dry season lasts between 6 and 8 months. Precipitation range varies between 400 and 600 mm per year, and the average annual temperature is 12.5°C, for the coast zone and 10°C, for the hinterland.

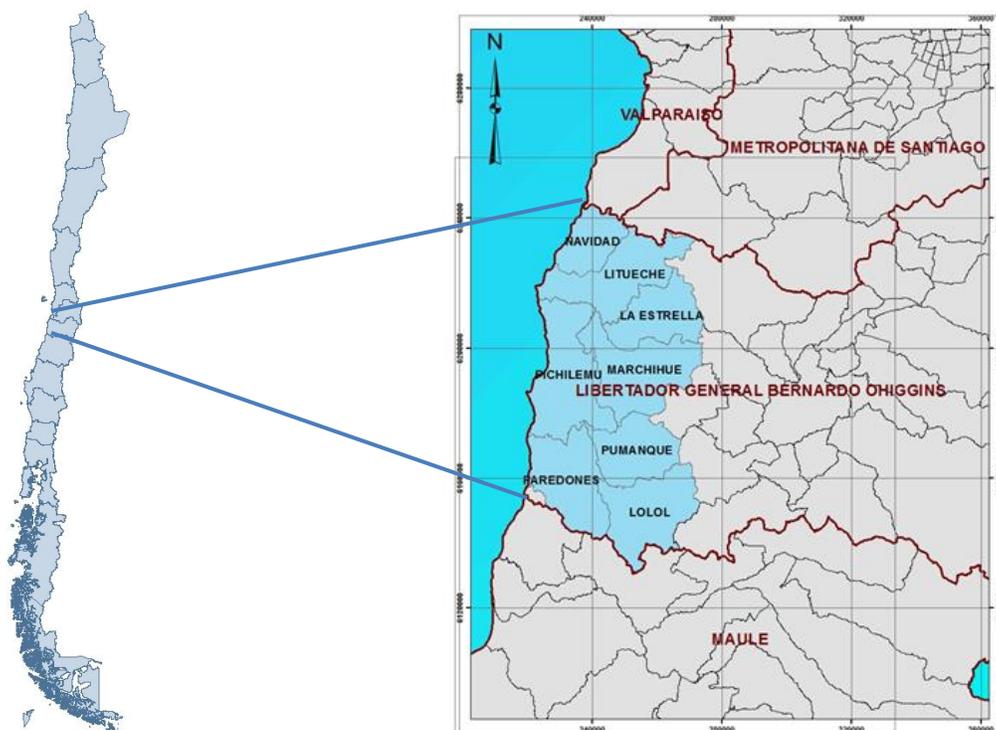


Figure 4: Communes at the Project level in region of O'Higgins

The total area of these eight communes reaches 420 thousand hectares, among them 327 thousand hectares can be classified as agricultural, forestry and livestock hectares of production. The total number of farms is 5.767. Among them 62% are small farms, each one of them comprise an area no larger than 20 hectares (table 2)

Category: Farm Size (hectares)	Number of farms in each category	Percentage over sum	Number of hectares in each category	Percentage over sum	Number of hectares used A&F&L*
< 20	3.549	62%	23.006,6	5%	18.970,9
< 50	4.534	79%	54.554,7	13%	44.291,4
50 - 100	599	10%	41.583,4	10%	32.479,5
100- 500	483	8%	98.468,9	23%	75.880,0
> 500	151	3%	225.481,4	54%	174.909,4
Sum	5.767		420.088,4		327.560,4

*A&F&L: agriculture, forestry and livestock

Table 2: Number of farms, considering farm size and total area in each category.

Source: ODEPA², Censo Agropecuario 2007 INE

Considering the entire extent used for agricultural, forestry and livestock activities, 11% of this area is used in crop production, including 35.681 hectares (table 3), 38% is used

² Available on:

<http://www.odepa.gob.cl/articulos/MostrarDetalle.action;jsessionid=E9CBBA51B56CEDE828FC92E882863BD0?idn=4534&idcla=12>

in forestry plantations and 2% in pastures for livestock feeding. The 49% of the area contains both natural and improved meadows.

Production	Hectares	Percentage
Crops	35.681,4	11%
Pastures	6.158,0	2%
Natural and improved meadows	159.681,2	49%
Forestry	125.778,2	38%
Total	327.298,8	100%

Table 3: Número de hectáreas de acuerdo al tipo de producción.
Fuente: ODEPA, Censo Agropecuario 2007 INE

Most of the area used for crops, is cultivated with vegetables, reaching the 38%. Other crops of economic importance in the project area are: cereals, fruits, grapes, vineyards and flowers (table 4, figure 5).

Production	Hectares	Percentage
Cereals	4.806,7	13,5%
Legumes	1.078,9	3,0%
Industrial crops	227,1	0,6%
Seedbed	196,2	0,5%
Fruits	4.488,2	12,6%
Grapes and Vineyards	5.663,4	15,9%
Vegetables	13.881,2	38,9%
Flowers	5.339,7	15,0%
Total	35.681,4	100%

Table 4: Crop area and percentage, for each crop production type.
Source: ODEPA, Censo Agropecuario 2007 INE

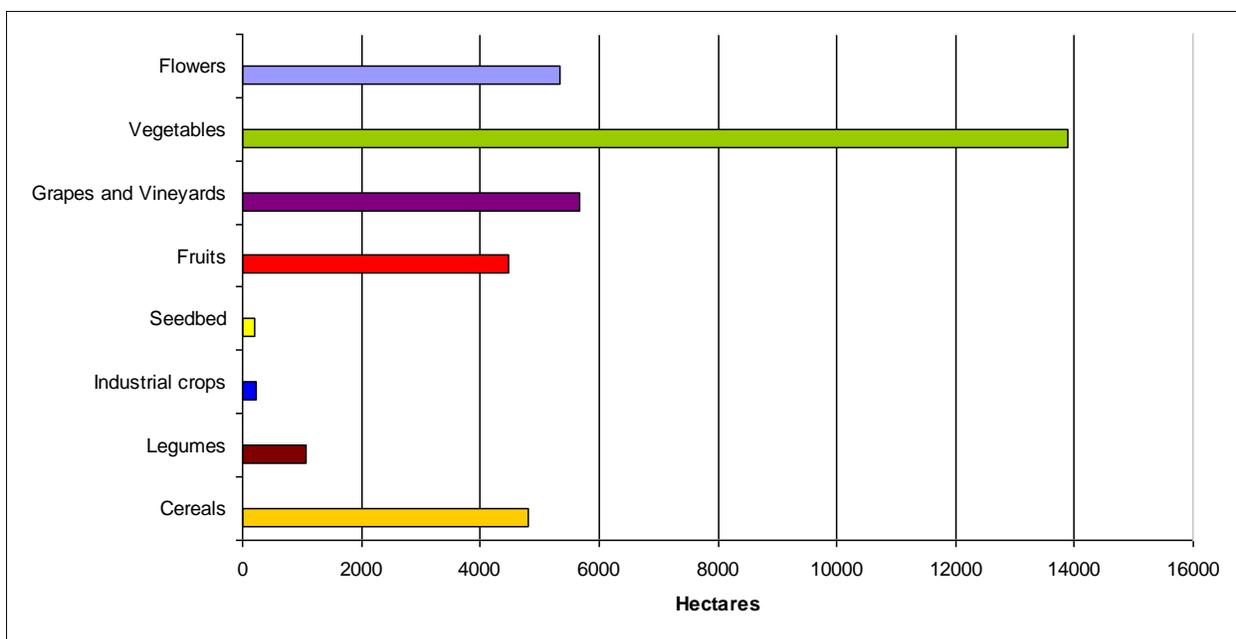


Figure 5: Crop hectares for each crop production type.
Source: ODEPA, Censo Agropecuario 2007 INE

White wheat production in non-irrigated areas, is very important for the small farmers economy in the project zone. Cereal species cultivated in the area are detailed in table 5.

Cereal type	Hectares under irrigation	Non-irrigated hectares	Production [quintals/hectare]	Number of Farms
White wheat	43,5	3.211,4	66.739	656
Bread wheat	0,0	55,5	1.491	14
Malting barley	0,0	2,6	78	3
Feed barley	0,7	202,4	3.706	79
Oat	39,6	719,2	14.325	228
Rye	0,0	6,6	43	3
Corn	335,4	130,7	32.807	279
Quinoa	0,0	58,6	581	27
Other	0,0	0,5	*	1
Sum	419,2	4.387,5		1.290

Table 5: Cereal production considering species and variety in the project area
Source: ODEPA, Censo Agropecuario 2007 INE

As the table above shows, a very little percentage of hectares in the project area is under irrigation. Corn plantations are the principal crop production under irrigation conditions.

The studies, contained in the Second National Communication of Chile³, indicate that in the O'Higgins region, climate change scenarios project a 44% of loss in the crop cultivated areas by the year 2040 and a 68% of loss by the year 2070. Wheat cultivated in dry-lands and corn are species with the higher losses. Also a 77% decrease of the "net income" of crops (average for the crops in the region) is projected by the year 2070 if no adaptation action is taken against climate change impacts. In the specific case of the corn crop, 69% of decrease in the net income has been projected. All data considers as business as usual the situation in the year 2007.

These projections show a high vulnerability of the rural communities of the area, both for long and midterms. The proposed actions will significantly avoid these negative effects.

There are a few constructions of minor size, for water storage. In general terms, the small farmers who irrigate their crops, do it at a very little scale and using precarious irrigation systems. They use irrigation during a short period of time, depending on water availability (FAO, 2010).

The extraction of forest products, also the use of lands for this purpose, and for agriculture and livestock production, have induced the elimination of the top covering layer of soil and have facilitate the erosion processes inside the soil structure. Bad practices both in production processes and overexploitation of natural resources, in non-irrigated areas, have strongly impacted the zone, although these cannot be considered as causes of desertification (FAO, 2010⁴).

Livestock production is composed basically by sheep cattle production. 74% of the total cattle heads in the area corresponds to sheep cattle production (table 6). Sheep cattle and vegetables production are the main agricultural activities in the project area.

Livestock	heads	Percentage
Bovine	33.910	19,4%
Sheep	129.972	74,5%
Goat	10.689	6,1%
Sum	174.571	100%

Table 6: Number of heads in each category of cattle production
Source: ODEPA, Censo Agropecuario 2007 INE

Figures 6 and 7 schematically represent land use and cattle production, considering number of heads for each species, in the project area.

³ Economía Agraria UC 2009, Estimación del impacto socioeconómico del cambio climático en el sector silvoagropecuario de Chile.

⁴ "Gestión del riesgo de sequía y otros eventos climáticos extremos en Chile. Estudio piloto sobre la vulnerabilidad y la gestión local del riesgo". FAO Publication, 2010.

Land use in Project Area

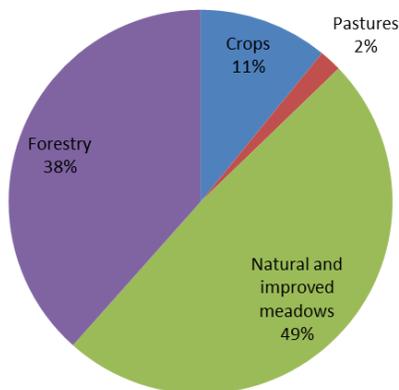


Figure 6: Land use in project area

Livestock in Project Area

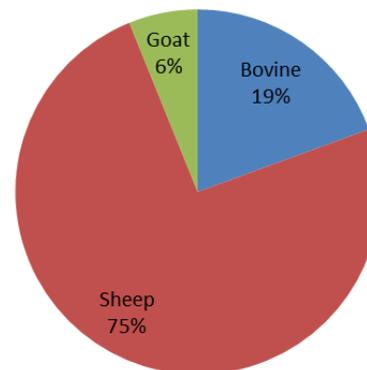


Figure 7: Heads for each cattle production

The rural population is above 60% of the total population living in the project area. The rural population has lower incomes and higher poverty than the regional and national averages, while Unsatisfied Basic Needs are commonly detected, especially in rural homes.

The poorest communes are Pichilemu (poverty index 17.6%), Paredones (poverty index 16.6%) and Lolol (poverty index 16.7%), while Litueche and La Estrella have ranges of poverty around 15.7% (Ministry of Social Development, 2009⁵). All of these communes have higher index of poverty than the national average (15.1%) and the regional average (12.8%)

Furthermore, rural migration to cities, has determined the aging of the rural population who lives in these communes and also, a grater social vulnerability of the rural populations which live in non-irrigated areas of the region (PNUD, 2008⁶). Nevertheless the region of O'Higgins, has kept its population at a constant rate, but with a higher number of male population. The reason for this condition lays in the fact that women have migrated to the cities, in order to find better conditions to work in urban jobs and men have stayed in the farms, working in agricultural activities (FAO, 2010).

⁵ Poverty is estimated with the following formula: $\text{Poverty Line} = \text{CB} * k$ where:

CB: it is the amount of money required to satisfy one person's basic need for food. To calculate this amount a basic food basket has been constructed which considers minimum of calories and proteins that a person needs in order to satisfy the basic nutritional requirements. This basket has been modified through time and considering inflation in Chile.

K: it is a coefficient that varies for urban and rural areas: Rural areas: $k = 1.75$; Urban areas: $k = 2$.

According to Ministry of Social Development, in the year 2009 the values of poverty line are:

Rural areas = CLP \$43,242 (USD \$85.77)

Urban areas = CLP \$64,134 (USD \$127.22)

(considering 1 USD = CLP\$ 504,13, average USD value for July 2013)

⁶ "Desarrollo humano en Chile rural. Seis millones por nuevos caminos." PNUD

Table 7, shows a summary of social conditions of the farmers in the area of the project, considering production issues such as connections to exportation markets or agro-industries. This information has been obtained from the Agricultural Census, which took place in 2007. In the data, it can be observed that only 27% of the total numbers of farmers in the area (5.767 farmers) are women producers and 59% are men producers. The access to export markets and the sale of products to agro-industries are precarious. Only 4% of the farms are linked to export markets and 3% to agro-industries. Farmers who received financing between 2005 to 2007 years reach an 18% and those who received support from other support means (described in detail in table 8) reach the 25%. Finally, the level of organization of these agricultural communities is very low. Only 6% of the farm owners have some kind of relation with an organization.

Description	Women		Men		Other*		Sum Project Area	Percentage (over 5.767 farms)
	Number of farmers	Percentage over Sum Project Area	Number of farmers	Percentage over Sum Project Area	Number	Percentage over Sum Project Area		
Farmers who live permanently in the holding	864	15%	1.841	32%	779	14%	5.767	100%
Farmers who do not live in the holding	698	12%	1.585	27%				
Farms linked to export markets	33	15%	97	45%	86	40%	216	4%
Farms linked to agro-industry	25	15%	74	44%	68	41%	167	3%
Farmers who received financing (2005-2007)	201	19%	789	74%	73	7%	1.063	18%
Farmers who received other support means	323	23%	938	66%	168	12%	1.429	25%
Farmers belonging to an organization	65	18%	232	65%	58	16%	355	6%
Farmers who do not belong to an organization	1.498	28%	3.202	59%	726	13%	5.426	94%

*groups of inheritors; societies and indigenous communities.

Table 7: Social and financing conditions of the farmers in the project area, considering gender.

Source: ODEPA, Censo Agropecuario 2007 INE

Table 8 shows the detailed participation of farmers in other support means, which are supported by Chilean Government.

Farmer type	Support means								Sum Project Area
	Technical Assistance INDAP	TT Groups	CORFO support means	FIA programs	Best Practices for agriculture and livestock	PABCO	SENCE exemption	Agricultural insurance	
Women	171	9	2	2	7	1	1	2	195
Men	619	33	7	4	21	9	13	8	714
Other*	25	4	5	3	12	16	11	7	83
Sum	815	46	14	9	40	26	25	17	992

*groups of inheritors; societies and indigenous communities.

Table 8: Farmers who had access to other support means for agricultural production, between 2005 and 2007 years, considering gender. Source: ODEPA, Censo Agropecuario 2007 INE

Table 9 shows this information disaggregated by gender. There are 1.562 producers classified as women and 3.426 classified as men. For each category (women / men) the percentage of participation of these producers in export markets, agro-industry and support means for the production, is similar for both categories compared to the total number of individuals in each gender category. Also the level of organization is similar between men and women, with a slight increase in the case of men. Finally, the farmers who access to financing are mostly men.

Description	Women		Men	
	Number of farmers	Percentage*	Number of farmers	Percentage*
Total of farmers	1.562	100%	3.426	100%
Linked to export markets	33	2%	97	3%
Linked to agro-industry	25	2%	74	2%
Received financing (2005-2007)	201	13%	789	23%
Received other support means	323	21%	938	27%
Belonging to an organization	65	4%	232	7%
Do not belong to an organization	1.498	96%	3.202	93%

*Porcentaje over total number of women or men

Table 9: Social and financing conditions of the farmers in the project area, disaggregated by gender.

Source: ODEPA, Censo Agropecuario 2007 INE

According to the information of the Institute for Agriculture Development (INDAP), service under the Ministry of Agriculture, in the rain-fed areas of the region of O'Higgins, there are 2.241 producers classified as smallfarmers and subsistence farmers. The social and economic considerations used by INDAP, to make this classification, are as follows: their assets are equal or below 3,500 "unidades de fomento" UF⁷, their incomes come from agricultural activities (mostly) and they work directly in the farms. Some of them, classified by INDAP as "campesinos", in addition to the conditions indicated above, live and work in the farms, and the total area covered by that farm must be equal or below 12 "hectáreas de riego básico"⁸.

The components developed for this project, are specially focused on smallfarmers and subsistence farmers of the area. Among the components, the adaptation measures related to water resources are primarily important for the small agriculture of this zone,

⁷ UF: amount regulated by inflation in Chile.

July 31st 2013: 1 UF = CLP \$ 22.949,89 = 1 UF = USD \$45.5
(considering 1 USD = CLP\$ 504,13, average USD value for July 2013)

⁸ Hectárea de riego básico: equivalence that connects the soil use capacity (considering Use Capacity Classification for Soils) regarding the soil with the best use capacity in the country. Is the area equivalent to the production potential of 1 irrigated hectare, with Capacity of Use Class I, located in the Valley of Maipo River (Metropolitan Region of Santiago)

where the main obstacle to develop small and subsistence agriculture rests on water scarcity, due to the new climate conditions and the increasing demand for the resource.

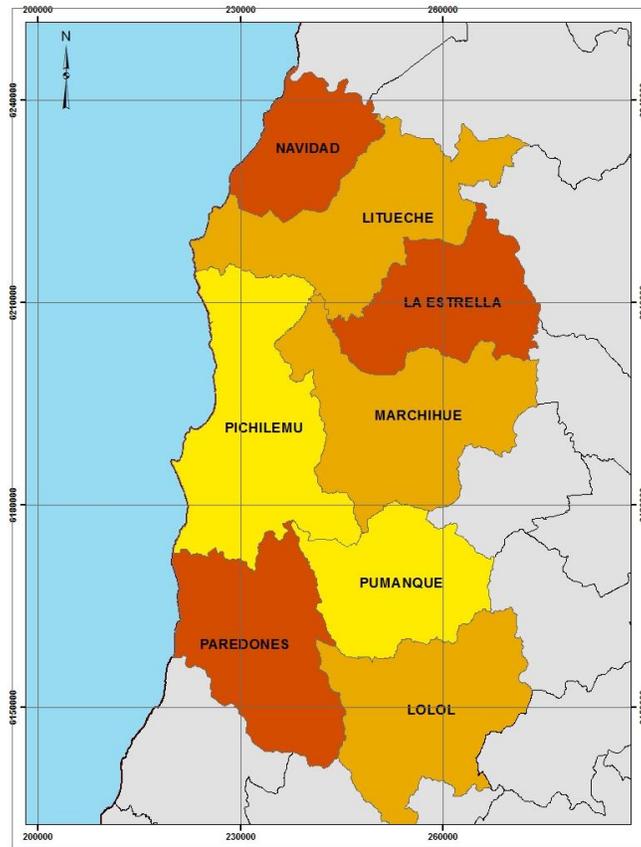
Nowadays, the main problems the small farmers of the area face, regarding water resources are:

- Increasing of water demand by agricultural production (due to an increase of cultivated areas), human consumption (due to an increase in population and also in individual consumption) and hydroelectricity and mining.
- Water rights of surface water are almost completely assigned. Water rights to pump underground water are also assigned in some areas (DGA, 2013⁹).
- Pressures over the extraction of water resources increase during scarcity and draught periods.
- Lack of knowledge related to aquifers and underground water systems and their hydrologic and hydrogeological conditions.

On the other hand, according to the “Mapa Preliminar de la Desertificación en Chile” (Chilean Desertification Map), the communes mostly affected by desertification processes, among the communes located in the dryland areas of the region of O’Higgins are: Navidad, La Estrella and Paredones (figure 8).

In the communes of Navidad, Litueche, La Estrella and Pichilemu, several zones can be identified where overgrazing has generated soil compression, decreasing the level of permeability of the soil. Larger areas have lost the soil top or at most, are covered by a slight layer of degraded soil, exposed and unprotected. The basins have limited water storage capacity, due to the inexistence of processes that retain the flow. Surface runoffs through temporary watercourses, which drain into main watercourses, maintain water for a limited period of time after the rainfall has occurred (FAO, 2010).

⁹ Prohibition and Restriction Areas for underground water pumping. Available on: http://www.dga.cl/administracionrecursos_hidricos/aprohibicion/Paginas/default.aspx and http://www.dga.cl/administracionrecursos_hidricos/areasderestriccion/Paginas/default.aspx



Desertification level: ■ Severe ■ Moderate ■ Slight

Figure 8: Erosion and Desertification in the communes of the project area. Source: CONAF- Programa de Acción Nacional contra la Desertificación / PANCD (2000).

According to climate change projections, previously mentioned, this region is located among the area that will be most affected by precipitation decreases. Models show a high degree of certainty in this matter. This situation will certainly increase the difficulties that the smallfarmers of the area actually face, regarding water scarcity and soil degradation. It will affect not only their production, but also the already degraded soil quality, the ecosystems and biodiversity. It will intensify the current problems these populations of small and subsistence farmers tackle, who are classified among the poorest of the region, exacerbating their poverty situation and increasing their vulnerability to climate conditions.

■ PROJECT / PROGRAMME OBJECTIVES:

List the main objectives of the project/programme.

Main objective:

- Increase resilience capacity of rural farm communities in the coastal and inner dry lands of the O'Higgins region with respect to actual climate variation and future climate changes.

Specific objectives:

- Implementation of a capacity building and training systems to increment the resilience capacity of farm communities vulnerable to climate change.
- Implementation of measures and technology packages to improve climate change adaptation with respect to cattle, crop and soil management.
- Improve the decision supporting information management for actual climate and future climate changes for local professionals and farmer communities
- Implementation of measures and technologies for increasing water resources availability for rural communities in the coastal and inner dry lands of the O'Higgins region.

The proposed project is aligned with the Adaptation Fund results framework:

The Component 2 aims to update the risks to climate conditions and advise and guide the farmers, so it is aligned with the Outcome 1: reduced exposure at national level to climate-related hazards and threats.

The three components are aligned with the Outcome 2: Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses. Component 1, through the local technicians and public workers that will enhance their capacities and transmit them to the farmers in demonstration fields and the technological packages; Component 2: aims precisely to strengthen capacities of technicians, public workers, consultants, etc., to enhance the advisory labor and also Component 3 has a capacity building factor, because local public workers and advisors should be capable to give advice regarding the new installation for water harvesting.

Component 1 is also aligned with Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level. In this case with the installation of rainfall harvesting systems, the farmers could appropriate respond to predicted impacts, considering the new technologies and varieties they will be able to manage.

Component 3 is aligned with Outcome 4: Increased adaptive capacity within relevant development and natural resource sectors, considering the installation of new infrastructure that will help to the farmers to face climate change.

■ PROJECT / PROGRAMME COMPONENTS AND FINANCING:

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

For the case of a programme, individual components are likely to refer to specific subsets of stakeholders, regions and/or sectors that can be addressed through a set of well defined interventions / projects.

PROJECT/PROGRAMME COMPONENTS	EXPECTED CONCRETE OUTPUTS	EXPECTED OUTCOMES	AMOUNT (US\$)
1.-Increase resilience capacity of rural communities in food and livestock production systems as adaption measures to climate variability and climate change.	Implementation of 4 demonstration fields for agro- technology transfer focused on cultivation and land management issues.	Increased resilience capacity of rural farmer communities to climate change effects by enhancing their abilities in cattle and crop management in irrigated and non-irrigated land.	1.700.000
	Creation of advisory teams for training and capacity building.		840.000
	Training of local groups in the supervision of technology transfer activities and maintenance of the 4 demonstration fields.		
	Provision of technology packages for wheat varieties tolerant to water stress (droughts and flooding)		600.000
	Implementation of the technology packages as pilot project in		

	demonstration sites for validation and technology transfer to local farmers.		
	<p>Provision of technology packages for pasture varieties tolerant to water stress and extreme temperature.</p> <p>Improved cattle and grazing strategies as management options for to climate change related alterations in biotic and abiotic conditions.</p> <p>Implementation of the technology packages as pilot project in demonstration sites for validation and technology transfer to local farmers.</p>		1.200.000
	<p>Provision of packages for efficient alternative technologies for corn farming in irrigated areas.</p> <p>Implementation of</p>		600.000

	the technology packages as pilot project in demonstration sites for validation and technology transfer to local farmers.		
2.-Improve the agro-meteorological information management in the O'Higgins region.	Maintenance of an Agro-climate Observatory	Improved capacity in agro-meteorological information management and climate risk assessment.	500.000
	Installation of capabilities for analysis of the effects of climate change and extreme weather events and their impact on vulnerable sectors		700.000
	Extension and training for producers and professionals of the agricultural sector regarding the experiences and lessons learned.		620.000
3.-Improve water resources availability on the farm level for rural communities.	Installation of rainwater and surface runoff harvesting systems on the farm level.	Increased resilience capacity of rural farmer communities to climate change by enhancing their abilities in water harvesting and resources management.	900.000
	Capacity building and training of rural farmer communities in the use of rainwater and surface runoff harvesting systems.		700.000

6. Project/Programme Execution cost		810.000
7. Total Project/Programme Cost		9.170.000
8. Project/programme Cycle Management Fee charged by the Implementing Entity (if applicable)		800.000
9. Total		9.970.000

PROJECTED CALENDAR:

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

MILESTONES	EXPECTED DATES
Start of Project/Programme Implementation	2014
Mid-term Review (if planned)	2016
Project/Programme Closing	2017
Terminal Evaluation	2018

PART II: PROJECT / PROGRAMME JUSTIFICATION

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

The National Action Plan for Climate Change, prepared by the Government of Chile in 2008, has been the driving shaft of all national initiatives, aimed at evaluating the potential impacts of climate change, as well as the vulnerability of different economic sectors of the country and their capacity to adapt to adverse weather conditions. It has also operated as the articulator of a set of political guidelines, implemented by public institutions which activities are relevant in relation to climate change and its adverse effects, giving guidance to the productive and academic sectors and non-governmental organizations.

In the specific case of the Ministry of Agriculture, as part of the efforts to comply with this National Plan, a sectorial plan of adaptation to climate change has been developed, framing a series of actions linked to the institutional mandate through the application of instruments and development of studies. It was developed by a technical group with representatives of the ten Services depending on the Ministry of Agriculture. The main focus of this plan is the rural family agriculture, concept that encompasses 78% of the Chilean forest and agricultural exploitations. These exploitations are characterized for

being small areas, mostly owned by old persons, lacking an appropriate technological level.

Chile has based its forestry and agricultural development on a model based on exports, which has made possible a sustained growth under the premise of turning the country into an “Agriculture, Food and Forest Authority”. This effort requires enhancing productive linkages among different production systems including rural and indigenous communities. The implementation of the Adaptation Plan in the agricultural development framework that has been defined for the country requires a proper uptake by the agriculture of small productive patterns, adding the dimension of sustainability, coupled with the need for strategies and methodologies that will allow an adequate development of concrete actions.

As it was indicated before, different analysis have been carried out, which shows the exposition and vulnerability of rural communes. One of them, analysed climate change vulnerability of 20 different agricultural groups from the Aymara population in the north of Chile to the cattle farmers in the Patagonian pampa in the south. Their total vulnerability to potential climate change impacts has been estimated as the sum of 6 specific impacts, caused by: (i) soil erosion, (ii) water shortage in dry areas, (iii) water shortage in irrigated areas, (iv) plagues and diseases, (v) crop development (plant phenology) and (vi) heat stress on crops and livestock.

The results of this survey (Tab.1) show that the most vulnerable groups are: farmers in the dry areas of central Chile between the regions of Valparaíso and Biobío, farmers in the transversal valleys of the regions of Atacama and Coquimbo and the extensive cattle farmers in the dray areas of central Chile. The target beneficiaries of this proposal are among all this groups. Water availability and management has been identified as the key issue related to climate threats, followed by heat stress on crops and livestock.

The region of O’Higgins includes productive systems based both on rainfed and irrigation. Rainfed agriculture concentrates a high proportion of small farms, focused on annual crops, mainly cereals and vegetables, but also including ranching based on sheep production. On the other hand, irrigated agriculture focuses on systems aimed at the production of inputs for other links in the agricultural sector, mainly corn crops under irrigation.

According to the possible climate change scenarios, the selected area will be affected by a strong rainfall decline, increased temperatures and an increase in the probability of the occurrence of extreme events, especially drought, exacerbating the actual tough conditions imposed by short but intense periods of rain during the winter, a long dry period, high summer temperatures, irregular topography and heavy clay soils. Also an increase on the demand for water resources is expected due to the consumption of vineyards and olive orchards belonging to big firms.

In the region, there have been developed early but limited initiatives linked capacity building and experiences around agricultural emergencies, resilience for agricultural

systems both of rainfed production and irrigation. Also there are institutions linked to of technology transfer, administered by the Government and also by individuals, which would allow the coordinated implementation of the actions and its transference to local farmers.

For this reason the programme propose that the growth and enrichment of resilience against new conditions of soil and climate, is possible to achieve through the implementation of concrete actions for adaptation by vulnerable rural communities, with a focus on the territory, frameworks, scopes and time horizons. This working hypothesis is based on the capabilities that the local communities have developed historically in their interaction with the soil and climate, in extreme conditions that occur in the ecosystems of dry-land areas in Chile. All of it, supported with the transfer of new technologies.

Methodologically the proposal considers the execution of actions focused on three components. These aims to construction and improvement of capacities in adaptation to climate change, knowledge management and provision of new infrastructure to rural communities that inhabit the zone of dry-lands, coastal and interior of the Region of O'Higgins.

An important outcome of the lessons learned from the implementation of the proposal is related to obtain information and guidelines that allow the enrichment of public policies for the agricultural sector. These policies detailed in the Second National Communication of Climate Change of Chile before the UNFCCC (Irrigation Law, System for Recovery of Degraded Soils, Irrigation Farmer Programme) are aimed at the legal mandate of the Ministry of Agriculture of Chile that holds productive purposes, but also generates important positive environmental externalities and adaptation to the effects of climate change. Many of them have been recognized as built-in and early actions in the sectorial adaptation plan, recognizing the need for adjustments for their best performance.

Component 1:

The first component is related to the design and physical implementation of 4 demonstration fields, which consist of systems at the farm level configured for capacity building and transfer of technology by teams of liaison activities in the chosen area. Implementation activities will concentrate on the purchase of machinery, equipment, and hiring of workers for the construction of farm infrastructure; construction and enabling of infrastructure to study and analyze knowledge; and expenses for administration and maintenance of the demonstration centers.

The precise location of the pilot sites indicated in the Component 1 of the proposal will be defined during the project implementation. The main criteria for the pilot sites selection is that each one of them will hold a certain area and the sites to be selected will be owned by farmers of the project area and/or will be farms under the Agriculture

Investigations Institute (INIA). These sites should not exceed an area of 20 hectares because their scale and operation must be accommodated to the reality of the farmers in the area.

The activities are:

- Establishment of professional teams of extension workers, that will allow technology transfer and dissemination regard the use of new crop varieties and pastures, livestock production and farming activities considering soil and water management. These activities will be developed on demonstration fields but also inside the farms of the project area. The professional teams will have exclusive dedication to this job and will be focused on transferring technologies and farming adequate practices to the rural community and also the extension workers will monitor and evaluate the results. The teams will be set as follows:
 - For each demonstration field, a manager responsible for the delivery and coordination of the technical contents, will be hired and an administrator who will ensure the allocation of resources and logistics for the operation of the infrastructure and machinery. Also, workers and field workers must be hired.
 - A team of 5 professionals is also going to be hired. They will be responsible for the delivery of knowledge in field days, the monitoring and follow-up inside the farms of rural communities located close to the sites.
- Soil management: management systems develop through field work, aimed to incorporate organic matter (carbon) inside the soil, combining both the intake and the conservation of water with other techniques aimed to improve the soil fertility and structure, optimizing the infiltration and water retention capacity of the soil. For this purpose three combined approaches of conservation measures will be established:
 - Keyline: set of principles, techniques and systems, that make up a practical plan for the sustainable development of urban and rural landscapes
 - Holistic: management of ecosystems considering the water cycle, the cycle of minerals, the flow of solar energy, and the dynamics of communities.
 - Permaculture: design and maintenance of small productive ecosystems, together with the harmonious integration of the environment, people and their homes, providing answers to their needs in a sustainable manner.

The diffusion of these techniques shall be carried out in 15 field days for 20 participants each, on demonstration fields, and the on-site implementation of the techniques in 15 representative farms among the farms of the rural communities near the centers.

Regarding the demonstration models, they are focused in development and transfer of technological packages to farmers. These packages incorporate wheat varieties and

pastures adapted to climate change, joined with practices and activities that increase the area cultivated with these crops, its sustainability and performance.

The technologies will consist of:

- Modifications in the date of sowing.
- Introduction of tillage practices aimed to improve the infiltration and retention of water inside the soil profile.
- Introduction of new varieties of cereals adapted to climate change conditions: cultivars with a short cycle of reproduction and a higher resistance to water stress, as an adaptation measure to the shortening of the period in which the soil profile will be able to keep its humidity, due to draught events.
- Adjust in the application of fertilizers and control of weeds according to new production potentials.
- Changes crop rotations through the introduction of a legume-cereal rotation system. The advantages to be gained from these rotations with legumes are the renewal of the soil fertility in particular the increases of Nitrogen due to biological fixation and the amount of organic matter of soils.

Regarding the varieties of cereals, these correspond to products already developed by the Institute of Agricultural Investigations (INIA), and in the case of pastures, these will be available once they have been successfully field tested during the first year of implementation of the propose project. The delivery of seeds to the farmers who will benefit from this component is included in the amount requested by the project.

In the case of pastures, mixtures of forage legumes of annual cycle and subterranean clover will be used (*Trifolium subterraneum*) with species of high seminal hardness (*Medicago polymorpha*, *Trifolium michelianum* and *T. vesiculosum*). This attribute allows them to adapt to the rotation system and also to new climate conditions. The biomass and seed production and also the ability to maintain a deposit of seeds sufficiently abundant and stable to allow the natural reseeding of the Prairie after the phases of cereal crops will be assessed. As a grain legume Lupine (*Lupinus albus*) and pea (*Pisum sativum*) are going to be used.

- Establishment of demonstration systems for wheat: different varieties of wheat already developed to endure climate future conditions will be tested in the field, as pilot models of production. The technicians will develop indicators considering the most adequate sowing date for the area, and will elaborate a schedule for preparation of the soil, sow, harvest and all the special techniques and practices for cropping. This knowledge will be broadcast to the farmers and rural communities. The technicians will be part of the process of implementation of these activities at the farms. They will monitor and evaluate the results at farm level. This is what we called a “technology package”
- Establishment of demonstration systems for sheep cattle production: a mixture of different varieties of pasture grasses already developed to endure climate future

conditions will be established in the farms. These varieties are aimed to feed a number of heads (stock) that must be adequate for the capacity of each particular production system, considering the infrastructure at the farm level (pilot cattle model) The technicians will develop indicators considering the most adequate sowing date for the area, and will implement the most adequate practices to quantify and increase the availability of dry matter and manage the grazing systems, to optimize the resources. The adjustment of animal stock per hectare will be also considered, and the improvement of productivity through sanitary and reproduction best practices. This knowledge will be broadcast to the farmers and rural communities. The technicians will be part of the process of implementation of these activities at the farms. They will monitor and evaluate the results at a farm level.

These technologies will be systematized in theoretical and practical contents that allow their dissemination and effective transfer to the producers of the rural communities through the following channels:

- 12 field days (3 per year for at least 20 farmers by activity)
 - 1 annual course about sheep livestock management (40 to 70 farmers).
 - Edition and Imprint of 200 training manuals in sheep management techniques, silage production and pasture management.
-
- Establishment of demonstration systems for corn crop under irrigation: varieties of corn already developed will be tested in the field, as pilot models of production, using gravity irrigation. The technicians will develop indicators considering the most adequate sowing date for the area, and will elaborate a schedule for preparation of the soil, sow, harvest and all the special techniques and practices for cropping and the construction and installation of the irrigation systems (“riego por pulso”, this system consist in carrying the water through a flexible hose to the irrigation sector, and then irrigate by gravity, helping to reduce the level of water consumption). The knowledge will be broadcast to the farmers and rural communities. The technicians will be part of the process of implementation of these activities at the farms. They will monitor and evaluate the results at farm level. The activities related to learning and knowledge management are:
 - 1,000 copies of a manual to be edited, printed and distributed.
 - 9 field days for at least 40 farmers by activity.
 - 2 theoretical-practical courses for technical advisors of INDAP. At least 40 professionals by activity.
 - 2 workshops for at least 30 students of agricultural schools and rural institutes.
 - 2 technical seminars, with the assistance of at least 120 farmers by activity.

Component 2:

The second component consists in a work schedule aimed to enhance the meteorological and agricultural information for the Region of O'Higgins and the best use of this information by the farmers of the project area and the technicians and professional of the local institutions.

The generation of capabilities targets to public and private professionals in the area. Capacities will be generated in the use of agro-meteorological information. This will increase the skills and improve the capacity of advice to the agricultural producers of the region. The final objective is to improve the decision-making process, made by the farmers. This includes the participation of international experts from the IRI Center of Columbia University, who will take part in technical seminars, courses and workshops who will join to a transitional local team.

This support will be realized through technical recommendations on productive options aimed at more than one agricultural season, so the domain of medium- or long-term screening tools for climatic conditions (e.g.: estimation of dry or rainy years, number of days with frost or probability of extreme events) would improve the level of skills and abilities allowing the farmers to develop strategies and decisions that make them more resilient to the effects of climate change.

Agro-climatic information basically will report weather conditions, i.e., meteorological parameters such as temperature, precipitation, solar radiation, direction and speed of wind, etc., and some predictive models of development of diseases for fruit trees.

There is a lack of analysis and interpretation of the information that helps to sustain decisions for agricultural issues, in a scientific-technical way, among the farmers and also among the technicians and authorities that work in agriculture. The current analysis are made at a global scale and do not represent our national reality, less the regional reality in the area. No historical analyses about climate conditions and extreme climate events are available. Also, there's a lack in the development of indicators to monitoring and prediction of extreme events.

The areas in which the activities will be developed are as follows:

- Maintenance of an Agro-climate Observatory: This system will be established through:
 - Creation of new shapes in GIS systems with information for the region both agricultural and meteorological. The meteorological data will be downscale to a higher resolution, to represent local conditions.
 - Creation of an observatory of climate risks to monitor the main agro-climatic variables and indicators of alert and prevention will also be developed, for the special case of extreme events in the project area

- Installation of capabilities for analysis of the effects of climate change and extreme weather events and their impact on vulnerable sectors:
 Consist in training in the generation and interpretation of agro-meteorological information via indicators and/or predictive models, carried out by an international team of experts, aimed at building capacity of public professional of local institutions, consultants, technical advisers and producers:
 - Expert advice for the development of new indexes and indicators for the extreme weather events in the dry-lands of the O'Higgins region.
 - Expert advice for the development of information layers that will integrate the Observatory according to requirements detected in vulnerable locations.
 - Implementation of the information on the Web Portal of the Observatory (load data, mathematical modeling, development of algorithms and routines, mapping, applications and online consultation system).
 - Training of 60 professionals and technicians, led by Columbia University experts in order to achieve an advanced in the domain of Data Library (DL) and Map Room.

- Extension and training to producers and professionals of the agricultural sector about the experience and lessons learned: This stage considers the development of e-learning module on agro-meteorology on CD format and a support on a Web Platform that considers the use of the DL-Map Room tools; and for a better interpretation of the information in the Observatory.
 As dissemination activities are considered:
 - 2 workshops of the e-learning course for 50 persons by activity.
 - Development of informative material: User's manual, posters, books, radio announcements, videos.

Finally, for expansion and effective transfer of knowledge to farmers and agriculture professionals in the Region of O'Higgins, the following activities are planned:

- Formación de equipo de extensionistas en temáticas sobre el uso de la información en relación al manejo predial.
- Seminar for the region of O'Higgins with 70 people participating, with the collaboration of national and international experts in management of the tools of the DL and Map Room of the Observatory.
- Course for 15 professionals of agriculture in DL tool and Map Room.
- 6 local workshops for 20 people each about the developed products and the Observatory.
- Implementation of three demonstration units with the installation of automatic meteorological stations.
- Team of field workers trained in topics related to the use of information and its handling and application at farm productions.

Component 3:

Finally, the third component aims to generate new water resources and take advantage of them. The main activity consists in the construction of rain harvesting systems. These systems will be constructed over the roof of the houses and barns. They will collect water and direct it through a system of pipes into an accumulator. The water generated by the short and intense precipitation events, that take place in winter season, will be storage for future uses.

Although the pre-installation advisory will define the productive orientations case to case, preliminary experiences targeting to the use of these new resources for farm production of vegetable, both cultivated on soil and hydroponic, hydroponic forage, fruit gardens, small greenhouses and provision for human and animal drinking water.

The implementation of this measure involves:

- Delivery, installation, training and monitoring for the implementation in 4 years of 90 systems of harvesting, storage and use of water collected from rainfall, segmented by storage capacity: 10 m³, 30 m³ and 50 m³.
- Formation of extension teams dedicated to the evaluation, installation, technical support and monitoring of the infrastructure previously installed (rain harvesting systems)

Considering that water scarcity will be increased in the future due to the alteration of rainfall patterns in the rainfed area and to the increase in the demand, the experiences and technology that will be collected and packaged will be useful to replicate these methods throughout the dry-lands in Chile, which territory covers 8 regions of the country (from Atacama to La Araucanía) concentrating 43% of the farms and 9% of the continental territory of the country.

Local communities in the region have a degree of associativity and express their recognition and need for adoption in its process of decision-making the new agro-climatic restrictions as a major factor in its future development. However, many of the communities lack of resources and capabilities considering the magnitude of impacts projected by climate change scenarios.

In this sense the coordinated interaction of the three components in the proposal (demonstration centers, technological packages, agro-meteorological information, building capacities, extension and implementation of infrastructure in the farms) will help to extend the benefits to the communities, from a perspective of inclusiveness and capacity building, increasing the resilience to climate change of production systems in the selected region.

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

In the proposed project area of the O'Higgins Region are living about 2200 small scale farmers which are relying on subsistence agriculture (source: Ministry of Agriculture). This group of farmers is particularly vulnerable to climate change because they are located in a region where decreasing precipitations are expected.

In the coastal dry lands of this region it is especially the exposure to droughts which threatens the local farmer families which are using their small land holdings to produce just enough for their own consumption. Climate scenarios suggest that this threat to local agriculture will even be worse in the near future when drought conditions are expected to linger or intensify.

It is therefore assumed that the proposed project activities will strengthen the adaptation capacity of these local farmers with respect to water management and water supply by using different techniques of rainwater harvesting as described in the Component 3.

On the other hand, the above mentioned small scale agriculture is also characterized by sheep farming. This activity however is carried out in an inefficient and low productive way. It is therefore supposed that the project outcomes related to knowledge and agro-technology transfer, which will be provided by the local offices of the Ministry of Agriculture, will strengthen the farmers' capacity with respect to enhanced breeding and grazing strategies.

The combination of the proposed adaptation measures with respect to water management and sheep farming will provide economic, social and environmental benefits for the most vulnerable agricultural communities in the O'Higgins Region and will reduce their risk to the negative impacts of climate change.

The activities to be carried out by each one of the proposed projects components are oriented towards farmer communities which are considered as the most vulnerable ones to climate change impacts due to their limited adaptation capacity and socio-economic constraints.

The expected outcomes of the proposed project components are taking into account the environmental conditions of the region of O'Higgins (soil, vegetation, water resources, degree of desertification and erosion), its agriculture and its socio-economic attributes.

This area with a predominantly small scale subsistence agriculture and self-sufficiency farming is lacking of appropriate know how and efficient agro-technology applications. It is therefore to be assumed, that the implementation of the proposed pilot projects in combination with best practice activities and demonstration fields will teach farmers how to improve yields and livestock productivity and will increase socio-economic benefits and foster environmental and ecosystem friendly farming techniques and resources management.

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

This approach proposes an effective package to manage the problems that the new conditions imposed by climate change will generate in Chilean agricultural systems, allowing to move forward proactively, taking advantage of local knowledge and empirically noting the advantages in monetary, environmental and social cost of moving from an emergency to an adaptation and increased resilience approach on rural communities. This new approach will not only allow to face the challenges imposed by climate change but also to take advantages of the opportunities open by the new climatic conditions.

The National Climate Change Action Plan 2008-2012, elaborated by CONAMA in 2008 has three strategic axes: adaptation to the impacts of climate change, mitigation of the GHG emissions and capacity building. This plan coordinated by the Ministry of Environment, has set specific tasks for the public institutions. Regarding adaptation, the plan established as a final compromise of the Ministries, the elaboration of proposals and sectorial adaptation plans to climate change.

The information generated in Chile, based on studies that have been developed over the last years, allowed to identify that most of the efforts and actions that need to be carried out in order to anticipate and adapt the agricultural systems to the climate change impacts, were been already applying through the Services under the Ministry of Agriculture, and those actions were planned for long terms. Initially they were directed to support the production, but then in the context of climate change adaptation, they can be considered as early measures, which, anyway, require adjusts and improvements.

The development of the Climate Change Adaptation Plan for Forestry and Agriculture, as a result of the implementation of the National Climate Change Action Plan 2008-2012, was an opportunity for the Services under the Ministry of Agriculture to participate in a joint work, through the establishment of a technical group of professionals, which elaborated a proposal of the plan.

This sectorial plan has been politically support and has passed through a consultation process with citizens and is a pioneer action among the other sectors. All its actions have political support. All the components (1, 2 and 3) of the proposed project correspond to real actions among those proposed in the Climate Change Adaptation Plan for Forestry and Agriculture; therefore all the components of the current proposal are cost effective, because cost effective issues were considered during the conception of the plan in which this components are based on.

For instance, the component 3, which consist in the installation of rain harvesting systems, is the best way to have access to free water resources. Our legislation is based on water rights, so to use water for an economic activity; the farmers must have water rights, both for superficial and underground water use. The real possibility to access to water rights in the project area is minimal and it would take a very long time to get the water rights for free (making an application to the General Directorate of Water) Both the aquifers and precarious superficial streams do not have enough water availability. To buy water rights is very expensive and also pumping wells should be

drilled to obtain the resource, with the high economic cost that this activity involves. Furthermore, even if all these actions can be made, an application to the General Directorate of Water must still be completed, to change the point where the water is pumped to the new extraction point. This application has to be technically approved too, considering availability inside the aquifers. The legislation indicates that the rain can be freely collected and conducted, so that the farmers do not need economic resources or special permission to use water from rainfall.

Also, in the case of component 1, all the new varieties that will be used have already been developed by INIA, so the sowing of these varieties on demonstration fields, the production of them and their inclusion into technology packages are economically more convenient than to start from the beginning studying and developing and practicing with other options of cultivars. The election of component 1 as a cost-effective action to increase resilience to climate change comes from the development of the sectorial plan.

Finally for the second component, as it was previously analyzed during the development of the sectorial plan for agriculture, the best way to improve the agro-meteorological information and to make it understandable and available to the farmers is through the establishment of an Observatory. Also this project aims to build capacity among professional and other users for them to be able to interpret this information and give advice to the farmers about its implications and how it will affect the productions during the forthcoming seasons.

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, sector strategies, national communications, or national adaptation programs of action, or other relevant instruments, where they exist.

In 2008 the National Commission for Environment – CONAMA- (actually Ministry of Environment – MMA-) elaborated the “National Climate Change Action Plan 2008-2012” which involved diverse action lines both for adaptation and mitigation to climate change. According to this document, and regarding Adaptation, the Climate Change Office of the MMA, has advanced in assessing the vulnerability and elaborating sectorial adaptation plans, in different sectors of economy, human and ecosystem services, among them: health, water resources, agriculture forestry and livestock, energy, infrastructure, fishing, biodiversity.

The “Climate Change Adaptation Plan for Forestry and Agriculture” was developed and agreed between MMA and Ministry of Agriculture – MINAGRI-, during 2011, 2012 and the first semester of 2013 and it involves 21 adaptation measures. Several of these measures are addressed to the poorest and the most vulnerable groups in the sector.

The 3 components of the proposed project are directly linked to the measures of the “Climate Change Adaptation Plan for Forestry and Agriculture”, and they can be considered as pilot projects and as a first step in the implementation process of this adaptation plan. The expected experience that will be obtained through the outcomes of

the project will be used to evaluate the successfulness of the measures and the improvement in the adaptation capacity of these communities.

E. Describe how the project / programme meets relevant national technical standards, where applicable, such as standards for environmental assessment, building codes, etc.

The implementation of this proposal counts on an active participation of the State dependent institutions and the existing legal framework and procedures, which includes direct and outsourced operations, via tender.

In addition, a large part of the actions and tasks considered in the implementation of small and medium-scale investments have technical standards, accredited by the National Institute of Standardization (INN), which are not legally binding in a direct way, but are considered as prerequisites in the terms of reference and/or in the accreditation of consultants or and technical services certified for the execution of works financed with State resources.

Considering the current legislation in Chile (Law 19300 modified by Law 20417 that establish the basis for environmental issues) and also considering the scale of the project and the nature of the activities involved in the proposal, this project do not have to present nor an evaluation or declaration of environmental impact.

Some activities will need pertinent authorizations such as building authorizations, but the process of approval must start at the implementation time and involves local institutions.

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

There are no other funding sources that would duplicate the measures proposed to be undertaken by this project.

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

The proposal aims at the establishment of outreaching teams for dissemination, technology transfer and monitoring of the application of the new cultivation systems, agrometeorological information; technological packages on crops and livestock; strengthening and capacity building of organizations, professionals of public institutions and civil society in the pilot area; and the adoption of comprehensive systems of generation of new water resources via small-scale rainwater harvesting.

The approach described above gives the proposal a distinctive attribute about chances of duplication against similar measures. This lies in that the components are made from

results of several projects of research I early actions, which only come at the most to the dissemination of results at seminars and workshops of short duration.

Additionally, the objective allows the expansion of existing productive paradigms, moving from a perspective of reaction or handling climate emergencies to the construction or strengthening the resilience of rural communities from the effects of climate change, coupled with the increase of social capital, generation of agrometeorological information and building capacity of public institutions.

The importance of the inclusion of a dimension of outreaching and permanent monitoring aims to systematize the process of implementation of the proposed measures, accompanying, in an comprehensive manner (technical, environmental, management and commercial advice) the adoption and capacity building in the final recipients of the proposed innovations, both in an intensive way through the demonstration fields or directly in the farms subject of improvement.

H. Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation, with particular reference to vulnerable groups, including gender considerations.

The actions of the proposed project are strongly linked to the adaptation measures of the national “Climate Change Adaptation Plan for Forestry and Agriculture” which has been identified by an expert group constituted by the different services of the Ministry of Agriculture and in cooperation with the Climate Change Office of the Ministry of Environment.

For the elaboration of the final version of this plan the proposed adaptation measures has been presented and discussed during 2012 in eight workshops in different Chilean regions including the region of O’Higgins.

This process of public consultation (“Consulta Pública”) has been carried out with a broad stakeholder participation including farmer communities, agribusiness representatives, public sector officials and academics. One of the main goals of this process was the identification of pilot projects as a first step towards the implementation of the national plan on a local scale and oriented to the needs of climate change adaptation at the local level.

In this request for project funding proposed adaptation measures in the O’Higgins region are the direct results of this stakeholder driven project identification process.

Of special importance in this context of project identification and with respect to its future implementation is the Institute for Agriculture Development (INDAP).

This institution, which belongs to the Ministry of Agriculture, is focused on the development of small farming activities and responsible for strengthening the human

and economic capacity of this sector with the aim of sustainable poverty reduction and increased competitiveness.

Additionally it should be mentioned that the Ministry of Agriculture has in all the country regions representations which will guarantee the proper project implementation and respective E&M activities and gender considerations.

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

Climate change and climate variability impacts in agriculture and livestock systems have a high economic, social, and environmental cost in dryland areas of the O'Higgins Region of Chile, especially due to water scarcity and draught. Current efforts to overcome this situation and mitigate the magnitude of these impacts have been limited to reactive responses. Regarding the events of draught, these reactive responses seek to solve the most urgent problems by providing water for human consumption through "water tankers" but without satisfying the demand for agriculture activities.

However no medium term preventive actions have been put in place to manage the effects of water shortage, considering the actual situation and the climate projections for the future. Therefore the farmer communities living in the project area are and will be highly vulnerable to water shortage related climate events threatening both: water availability for human consumption and for agriculture. It is therefore urgent to implement a mid and long term strategy to improve the adaptive capacity of the rural population in these areas.

The Chilean Government recognizes the urgent need of adapting to climate change within the context of sustainable development and has elaborated the national "Climate Change Adaptation Plan for Forestry and Agriculture". Its implementation however is aggravated by budget limitations. There is therefore a keen need for external support to enable the implementation of pilot projects in the project area to afford medium and long term preventive actions related to water supply for human consumption and crop and livestock management. These pilot projects, which are understood as a first step towards the implementation of the national adaptation plan, additionally will contribute to strengthen the capacities and expertise of the Ministry of Agriculture and its local institutions to create examples of best practise and to promote its application on a national level.

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

The 3 components of the proposed project have been designed considering that their implementation permit the sustainability of the results over time. The objective is that both the small farmers who will be benefit by the outputs and outcomes of the project and the professionals and experts belonging to the local institutions, develop special capacity to sustain the results.

The adaptation capacity will be built considering the specific and local needs of small farmers of the area. The first component considers the development and maintenance of demonstration fields for agro- technology transfer focused on cultivation and land management issues, which will provide the necessary tools that the smallfarmers need to endure the climate change risks.

The capacity and knowledge obtained through the activities described in the project components, will be kept by the local community and strengthen through the operation of these fields, over time. Furthermore, the 3 components also consider training of local groups and technology transfer activities, to assure steadiness and sustainability over time.

The actual institutions with local representation will guarantee the sustainability of the outcomes. Both the Ministries of Agriculture and Environment have regional officers called the “Seremi’s” (Ministerial Regional Secretaries). Among the Services of the Ministry of Agriculture, the “Instituto de Investigaciones Agropecuarias (INIA)” (Agriculture Investigations Institute), has the mission to generate and transfer knowledge and strategic technologies at global scale in order to innovate and enhance the agriculture competitiveness and, in the other hand, the “Instituto de Desarrollo Agropecuario (INDAP)” (Institute for Agriculture Development), has the mission to support the development of the smallfarmers agriculture to generate human, economic and productive resources that will contribute both to overcome the conditions of poverty and to make national agriculture sustainable and competitive. Both Services has local representation in the project area of the Region of O’Higgins and they’ll be a key to ensure the sustainability of the outcomes of the project components.

Thus, the services and institutions that already has local representation in the Region of O’Higgins will play the main role in the sustainability of the project outcomes.

PART III: IMPLEMENTATION ARRANGEMENTS

- A. Describe the arrangements for project / programme implementation.
- B. Describe the measures for financial and project / programme risk management.
- C. Describe the monitoring and evaluation arrangements and provide a budgeted M&E plan. Include break-down of how Implementing Entity’s fees will be utilized in the supervision of the monitoring and evaluation function.
- D. Include a results framework for the project proposal, including milestones, targets and indicators and sex-disaggregate targets and indicators, as appropriate. The

project or programme results framework should align with the goal and impact of the Adaptation Fund and should include at least one of the core outcome indicators from the AF's results framework that are applicable¹⁰.

- E. Include a detailed budget with budget notes, a budget on the Implementing Entity management fee use, and an explanation and a breakdown of the execution costs.
- F. Include a disbursement schedule with time-bound milestones.

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

- A. RECORD OF ENDORSEMENT ON BEHALF OF THE GOVERNMENT¹¹** *Provide the name and position of the government official and indicate date of endorsement. If this is a regional project/programme, list the endorsing officials all the participating countries. The endorsement letter(s) should be attached as an annex to the project/programme proposal. Please attach the endorsement letter(s) with this template; add as many participating governments if a regional project/programme:*

<i>Gladys Santis Adaptation Officer Climate Change Office Ministry of Environment</i>	<i>Date: August 23rd, 2013</i>
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- 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*

¹⁰ Please refer to the *Project level results framework and baseline guidance* for the Adaptation Fund's results framework and guidance on developing a results framework and establishing a baseline [add link here].

¹¹ Each Party shall designate and communicate to the Secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans (“National Action Plan on Climate Change”; “Climate Change Adaptation Plan for Forestry and Agriculture”) and subject to the approval by the Adaptation Fund Board, understands that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.



Jorge Daccarett Bahna
Executive Director AGCI
Implementing Entity Coordinator

Winter

Date: *September 25th, 2013*

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