

FORECCSA PROJECT

Enhancing resilience of communities to the adverse effects of climate change on food security, in Pichincha Province and the Jubones River basin

PROJECT COMPLETION REPORT

May, 2019

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LIST OF ACRONYMS

AbC	Community based adaptation
AbE	Ecosystem based adaptation
ALER	Latin American Association of Education and Popular Communication
CAMAREN	Consortium for the Management of Renewable Natural Resources
CC	Climate Change
CCRJ	Public Consortium of Decentralized Autonomous Governments of the Jubones River Basin
CDN	National Executive Committee of the FORECCSA Project
CEPAR	Center for Population Studies and Social Development
CGRR	Randi Randi Group Corporation
CIIFEN	International Center for the Investigation of the Phenomenon of the Child
CMNUCC	United Nations Framework Convention on Climate Change
COINCAD	Corporation for Research, Training and Development
COOTAD	Organic Code of Territorial Organization, Autonomy and Decentralization
CT	Technical Committee of the FORECCSA Project
DNACC	National Direction of Adaptation to Climate Change of the Ministry of the Environment
EMT	Independent Mid Term Evaluation
ENCC	National Climate Change Strategy
FA	Adaptation Fund
FACE	Funding Authorization and Certificate of Expenditures
FAO	United Nations Organization for Agriculture and Food
FLACSO	Latin America Faculty of Social Sciences
FVC	Green Climate Fund
FORECCSA	Project "Strengthening the resilience of communities facing the adverse effects of climate change with emphasis on food security in the Province of Pichincha and the Jubones River basin
GAD	Decentralized Autonomous Government
GAD PP	Decentralized Autonomous Government of the Province of Pichincha
INAMHI	National Institute of Meteorology and Hydrology
INIAP	National Institute of Agricultural Research
IPCC	Intergovernmental Panel on Climate Change
MAE	Ministry of Environment of Ecuador
MAG	Ministry of Agriculture and Livestock
MIPRO	Ministry of Industries and Productivity
M&E	Monitoring and Evaluation
ONG	No Governmental Organization
UN Women	United Nations Organization for Gender Equality and the Empowerment of Women
PACC	Adaptation in Climate Change with emphasis on Water Governance
PDOT	Development and Territorial Ordering Plan
PFSC	Strengthening, Sustainability and Closure Plan
POA	Annual Operative Plan
PRODOC	FORECCSA project document
SAGRC-SA	System of Support to the Management of the Climatic Risk for the Food Security
SAN	Food and Nutrition Security
SAT	Early Warning System
SCC	Undersecretary of Climate Change of the Ministry of the Environment
SENAGUA	National Water Secretariat
SENPLADES	National Secretariat of Planning and Development
SETECI	Technical Secretariat of International Cooperation
SNGRE	National Secretary of Risk Management of Ecuador
SIG	Geographic information systems
TDR	Terms of Reference
VAM	Analysis and Mapping of Food Vulnerability
WFP	World Food Programme

BACKGROUND AND CONTEXT

The project “Enhance Resilience of Communities to the Adverse Effects of Climate Change on Food Security in Pichincha Province and the Jubones River Basin in Ecuador” (FORECCSA) was approved in 2011 by the Adaptation Fund. The multilateral implementation agency was the United Nations World Food Program (WFP) and the role of executing agency in Ecuador was assumed by the Ministry of the Environment (MAE) in coordination with the Ministry of Agriculture (MAG¹).

The three institutions, through their highest authorities or their delegates, formed the project National Steering Committee (CDN), the highest authority for decision making for its execution. In a complementary manner, in 2013 the stakeholders responsible for the project created the Technical Committee (TC) as a technical platform for the joint analysis of implementation activities, in which the Autonomous Decentralized Government (GAD) of the Province of Pichincha, Consortium of the Jubones River Basin (CCRJ) and the local coordination of the Project participated.

The geographical area of intervention of the FORECCSA project covered fifty cantons and parishes, distributed in the Jubones river basin that covers part of the provinces of Azuay, El Oro and Loja; likewise, the Project also covered part of the province of Pichincha. In general, high levels of food insecurity were identified in these areas, affected by climatic threats such as melting glaciers, droughts, among others. Added to this was the scarce preparation of local populations to adapt to these threats. Therefore, in these communities’ high levels of vulnerability to climate change were defined in the field of food security.

The general goal of the FORECCSA project was to reduce the vulnerability to the adverse effects of climate change and the food insecurity of communities and ecosystems in the most vulnerable cantons of the Province of Pichincha and the Jubones River basin². The executing partners at the regional and local levels were the GAD of the province of Pichincha, thirty-seven municipal and parochial GADs of the Jubones river basin and, at the time, the consortium of said hydrographic basin.

In the FORECCSA project, two fundamental approaches were proposed: community-based adaptation and ecosystem-based adaptation. Each approach implemented participatory methodologies that allowed strengthening the capacity of the communities in the intervention areas, so that they can resist and recover from the effects of climate change on their production and consumption of food.

The fundamental concept and methodological support for the implementation of the project was the vision of linking the effects of climate change with its impact on food security and livelihoods on the most vulnerable populations in the intervention area. With this background, this report summarizes the results obtained that were compiled in the reports and policy brief of the technical and informative systematization of the project, as well as in the external evaluation and in the final data obtained through the monitoring system and evaluation implemented.

¹ This State institution maintained this name until the beginning of 2017. As of May, of that year, with the current National Government, this Ministry was restructured in two: Ministry of Agriculture and Livestock (MAG) and Ministry of Aquaculture and Fisheries. For this reason, for this report, the name of MAGAP is considered until May 2017 and, after that date, the identification as MAG, given that its collaboration in the FORECCSA Project continued, with this name, until the closing in 2018.

² Project description (2011: 37).

REPORT OBJECTIVES

- Summarize the results obtained with the implementation of the FORECCSA Project (2013 - 2018).
- Consolidate lessons learned from the implementation of the project.
- Extract the main conclusions of the final evaluation and completed systematizations of the FORECCSA Project as an outcome for knowledge management.

PROJECT FINAL RESULTS:

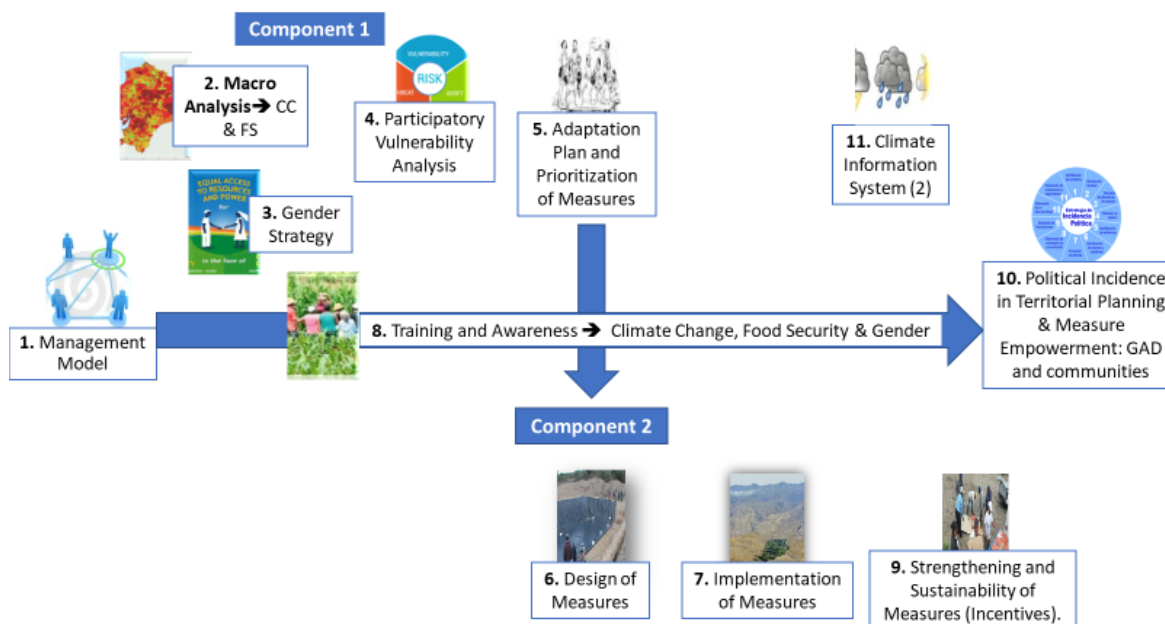
This section summarizes the main results of project implementation.

3.1 Main project Results

The goal of the project was to reduce vulnerability and food insecurity of communities and ecosystems, related to the adverse effects of climate change, in the most vulnerable cantons of Pichincha Province and the Jubones River Basin. The actions proposed to achieve this goal were considered in terms of the three fundamental transversal approaches established in the design of the Project: climate change, food security and gender. These actions obeyed the following specific objectives:

- 1) Increase knowledge to manage the risks of climate change that affect food security in the selected cantons.
- 2) Strengthen the adaptation capacity of highly vulnerable communities to food insecurity to respond to the impacts of climate change, including the variability in the selected cantons of the Pichincha Province and the Jubones River basin

In total, the FORECCSA project reached 19,356 beneficiaries in 240 communities. Through the project, 47 vulnerability and climate risk assessments at local level were made, 50 adaptation measures implemented, 2 early warning systems implemented on climate risk and food security, 49 local climate change adaptation plans designed, and 38 local governments have developed policies on adaptation. The figure below illustrates the detail of results achieved, organized by project component:



3.1.1 Component 1: Develop awareness and knowledge capacity at the community level on climate change and food insecurity related risks

Outcome 1.1. Increased awareness of communities on climate change risks and food security related risks

At the end of the project, greater knowledge was achieved on how to manage climate change related risks that affect food and nutrition security in the selected cantons of the province of Pichincha and the Jubones river basin. From the beginning of the implementation of the project, a sensitization and learning programme on climate change, food security and gender was developed in the Jubones river basin and in the province of Pichincha, and executed until the culmination of the project, reaching 16,335 people trained and sensitized of which 53% were women.

Within Project Component 1, numerous awareness and capacity building activities were carried out on climate change, food and nutrition security, and gender, as well as on specific issues regarding the increase of resilience at the local level. These activities were developed based on the progress of Component 2, because these activities had to be complemented later with the implementation of the adaptation measures that were part of the second component.

The first approach to the three axes of the project (climate change, food security and gender) was participatory awareness workshops, developed during the preparation of vulnerability studies, adaptation plans and profiles of adaptation measures, carried out by the consultants hired by the FORECCSA Project.

The design of the awareness campaign on climate change and food security with gender considerations was made through a consultancy with the Latin American Association of Education and Popular Communication (ALER) in 2014,³ based on the results of the vulnerability studies carried out. These studies were considered as the starting point with respect to the topics and contents to be included in the informative, communicative and edu-communicational activities of the awareness campaign. In the document, it was proposed that 13,000 people from the parishes of the Jubones river basin be the beneficiaries of the awareness campaign, so a communication map of the intervention area was included.

Among the campaign actions, the following were defined: a) massive informative component, through four micro-radial programs and testimonies from representatives of the upper, middle and lower zones of the basin; b) component of dialogue, with the realization of workshops in each of the parishes; and, c) edu-communication component, aimed at training trainers.

In the methodological principles of the design of the awareness campaign, the application of the intercultural, generational and gender approaches were used, within the normative and political framework of the Project. Regarding the inclusion of the gender approach, the project followed the lines of action established in the Project's Gender Mainstreaming Strategy . Regarding the approaches of climate change and food security, the information generated in the parish studies of vulnerability completed and in execution, and other macro studies carried out previously were used. In general, the

³ The purpose of this document was to guide the processes of awareness and awareness in the transversal axes of the project to the beneficiary populations of the parishes of the Jubones river basin. In the construction of the baseline of this document, some macro studies carried out previously were used for the project team (CGRR, 2018).

information generated previously in the vulnerability studies was used in the design of the awareness campaign , which allowed a continuity in the processes initiated with the participating social actors.

The Capacity Building Plan for the beneficiary populations of the parishes of the Jubones river basin was carried out by a consultancy with the Consortium for the Management of Renewable Natural Resources (CAMAREN) in 2017. The objective was to increase the knowledge to manage the risks of climate change that affected food and nutrition security in the prioritized cantons in the Jubones river basin.

The plan was designed in such a way to provide continuity and standardize the training previously conducted in the process of developing adaptation measures, as well as articulating with other documents and proposals developed in the field of training. In this process, adults were considered subjects of their own learning to foster a dialogue of knowledge to address their needs and problems associated with climate change, gender, and food and nutritional security.

The general procedure for capacity building covered some activities in correlation with the needs and interests of the different stakeholder groups: beneficiary populations, representatives of parish GADs and technical personnel of the FORECCSA Project. In this procedure, the establishment of alliances with State institutions, NGOs and universities was proposed based on the needs of the beneficiary populations and the types of adaptation measures designed and implemented.

The approaches of climate change, food security and gender were included transversally in the training processes. In the case of climate change, it was proposed to work on raising awareness and, in this way, to connect with the importance of the adaptation measures developed. About gender, the need was raised to show the differences between the impacts of climate change on men and women, as well as the analysis of the different labor burdens in terms of food security for families. All of this was complemented by the motivation of women's participation in the various programmed activities.

In summary, the Capacity Building Plan consisted of a content guide that covered the macro themes of the project:

- Adaptation to climate change: this issue was raised with the purpose of strengthening the community's knowledge about the Project, knowing its components and roles of the participating actors, as well as defining actions regarding the management of adaptation measures.
- Gender focus: this topic was presented to sensitize participants about the importance of considering a gender approach in the implementation of adaptation measures.

These thematic contents were validated by representatives of the GAD, State institutions and representatives of the beneficiary populations prior to the preparation of the training modules. A training module was developed for each type of adaptation measure. Besides, CAMAREN built a series of training modules on different topics related to:

- a) Climate change, food security and gender considerations (axes of the project).

- b) Strengthening of local capacities and adequate management of the different types of measures implemented.

Each of these modules was built around the "adult education" methodology. These modules were taught by the parochial promoters and by the local team of the Project.

In Pichincha, FORECCSA and the GAD PP hired the Corporation for Research, Training and Development (COINCAD), between August and November 2016, which facilitated the workshops to the twelve communities in the three axes mentioned. In the case of the Tocachi community, an external consultant to COINCAD had to be hired in 2018 as it had not yet been defined to work with the irrigation board of said community.

In addition, the GAD PP gave training workshops on administration, operation and maintenance of the adaptation measures for each group of beneficiaries where the measures were carried out. The total number of participants in the training and awareness activities are presented in Table 1:

Table 1: Number of participants in training workshops and awareness events in Pichincha

	Participants in training workshops		Participants in awareness-raising events	
	Men	Women	Men	Women
Total	5 327	6 837	2 127	2 150
Percentage	43,79%	56,21%	49,73%	50,27%

Source: Project results, 2018

Among all the climatic threats that can affect peasant family farmers and cause their food insecurity, drought is one of the most relevant according to the IPCC 2014⁴. In the case of the FORECCSA Project, the situation is the same. In 89% of beneficiary parishes, drought was the predominant climatic threat, according to the vulnerability studies carried out. For this reason, to strengthen the resilience of peasant family farmers, and to reduce their vulnerability to drought, "non-regret measures⁵" to adapt to climate change related to the most efficient and sustainable use of water were proposed, that allow maintaining the availability of food production.

Outcome 1.2. Secured ownership of adaptation measures in communities in targeted cantons

At the end of the project implementation 49 local plans for adaptation to climate change were prepared and 38 local governments developed policies to continue working on adaptation to climate change. This result was obtained as part of the community participation process carried out in the project

Vulnerability studies were developed in a participative way with the local populations, with the use of diverse didactic tools. The participation of men and women was encouraged. In some cases, mixed groups were organized and, in others, separated by sex, depending on the characteristics and needs of each parish.

⁴ https://www.ipcc.ch/pdf/assessment-report/ar5/wg2/ar5_wgII_spm_es.pdf

⁵ Non-regret adaptation measures are robust development actions that, based on a precautionary principle in the face of the effects of climate change, can be carried out "without remorse".

Subsequently, based on the results obtained in the vulnerability studies, the consulting teams developed some participatory processes with the populations of the participating parishes to answer the following questions:

- What actions should be considered in relation to the critical indicators of sensitivity and adaptive capacity? To answer this question, different teaching tools were used, one of them was brainstorming.
- What were the feasible actions? In these participatory processes, the ideas proposed were analyzed and the most feasible were selected based on the following criteria: feasibility, costs, synergies, urgency, number of potential families or beneficiary communities.
- What scope should the actions have? For this, files of the selected measures were constructed to define their scope.
- When could these activities start? With which partners and resources? Finally, a process of prioritization of the analyzed and selected measures was proposed.

In accordance with the results obtained through this participatory process, the planning document was structured as follows: 1) stakeholder analysis; 2) definition and prioritization of measures; 3) coverage and population involved; 4) identification of possible sources of financing; 5) management strategy; 6) articulation with PDOT; and, 7) alignment with the ENCC. In short, this document was the basis for the design of the adaptation measure in each parish.

The great challenge was to integrate, in a single plan structure, the approach of climate change, food security and gender. Finally, at the end of 2013 and the beginning of 2014, the technical team of the Project developed a basic structure for plans to adapt to climate change. It should be noted that the latest plans were prepared with the methodological guide of the MEC SCC to incorporate climate change into local planning, which was fed back with the FORECCSA process and issued in 2014.

Finally, the project supported the establishment of the necessary process with the GADs to incorporate CC, SAN and gender in local planning and support the MAE in its role as lead institution in charge of climate change at the national level. As a result, 32 parish plans were approved as presented in Table 14:

Table 14: Number of Adaptation to Climate Change Plans approved

Provinces	Number of parishes
Azuay	14
Loja	11
El Oro	7
Total	32

Source: M&E, FORECCSA Project 2018

Outcome 1.3. Increased knowledge to manage climate change and risk, including climate variability affecting food security

Within this component of the project, a System of support for climate risk management for food security of the Jubones river basin (SAGRC-SA) was introduced. This system is the result of several processes of analysis and reflection between the MAE, MAGAP, INAMHI, SGR and CIIFEN since 2014, based on food security and climate change approaches. It should be noted that this system was developed with the contributions of some consultancies carried out with CIIFEN.

In addition, the Support System for Climate Risk Management for Food Security in the Jubones River Basin (SAGRC-SA), is considered a pilot proposal at a regional level that, unlike conventional Early Warning Systems, is oriented to the planning, prevention and promotion of measures of adaptation to climate change towards specific and recurrent threats such as droughts, frosts and extreme rains; which maintain a pattern of increase in the intensity of their events in the Jubones basin, a basin mainly agricultural and livestock.

The SAGRC-SA was built and developed with the aim of providing information and important inputs for the support of planning processes and adaptation to climate change in the medium and long term. At the same time, it contributes to the prevention and preparation of the (sectoral) response in critical areas directly related to food security. The conception of this system comprised four interconnected modules through an orderly process. Key features of the modules are presented below:

- Vulnerability: it was built through a vulnerability baseline in food security for the Jubones river basin, specifically by a series of indices of the 2010 Population and Housing Census, in which an indicator exclusively of gender was integrated.
- Climate: this module was prepared with information regarding climatic projections, average temperature and monthly precipitation, and quarterly weather forecasts. The forecasts were included with the purpose of inferring a level of climatic risk through the analysis of vulnerability baseline information.
- Communication: in this module a series of protocols or procedures for the transmission of the information generated at the level of the MTT6 was proposed.
- Preparation of the response: in this module the mechanisms for preparing the response were established according to the different climate risk scenarios.

The four modules converge on a web platform - the heart of the system - through a circular operating process. The level of information management and the timely taking of actions within SAGRC-SA is anchored to the National Decentralized System of Risk Management and can be reached through the following link: http://200.110.94.18/geo_sagrc/

Finally, in the case of the province of Pichincha, the GADPP as an executing partner of the project, in coordination with INAMHI, installed new meteorological stations and are in the process of reinstallation, repowering and rehabilitation of other meteorological stations. This "Network of meteorological stations" included identification of the sites for implementation, conceptual, technical elements, and estimated budget (USD 110,000). The intention was that the proposed network of stations be multipurpose, it means that it can be used not only by the Project, but also by other relevant actors in the territory.

With the data generated from the network of meteorological stations, it is projected to generate relevant climate information in Pichincha that will be used for the elaboration of public climate news bulletins, which will minimize the negative aspects in the agricultural activities of the area under study.

3.1.2 Component 2: Increase adaptive capacity and reduce recurrent risks of climate variability at the community level

Outcome 2.1. Increased adaptive capacity and ecosystem resilience in targeted rural parishes

The adaptation capacity of communities with great food insecurity to respond to climate change was strengthened, including the variability in the selected cantons in the province of Pichincha and Jubones river basin (provinces of Loja, Cuenca and Azuay). This objective was achieved mainly through the implementation of 86 concrete adaptation measures in 50 parishes in 4 provinces of the country. The description of the implementation of the measures is summarized below, as well as the other indicators fulfilled as part of this component of the project.

The implementation model evolved throughout the three phases of the project. The period of implementation of adaptation measures was between the second (2013-2015) and the third (2015-2018) phases. The implementation of the measures was the responsibility of the two local entities: for Pichincha, responsibility was assigned to the Decentralized Autonomous Government of the Province of Pichincha (GAD PP); while for Jubones, it was under the CCRJ in the first phase, and under the MAE in conjunction with the parochial local government in the second phase. In Figure 1, a simplified outline of the Project implementation model is detailed.

The parish GADs made an important economic contribution that was reflected in the hiring of a local technician for the implementation and follow-up of the adaptation measures. This figure was a significant contribution for the beneficiaries who indicated the importance of training and awareness in the three topics of the Project (climate change, food security and gender), and in the implementation of the adaptation measure in each parish.

The beneficiary communities contributed through labor (*mingas*⁶) in the different activities to implement the adaptation measures. In specific cases, the Drinking Water and Irrigation Water Board also made contributions to implement the measures in each parish. In Table 2, the total number of parishes and communities where the project intervened during the execution is detailed:

Table 2: Number of parishes and communities where the project intervened

Province	No. Parishes	No. Communities
Azuay	19	122
El Oro	9	40
Loja	11	55

⁶ The word “minga” comes from the word in Kichwa language “minka” [minka, minga] s. communal work. Ayllullaktapura tantarishpa llamkana. Tukuykunami minkaman rina kanchik. (MINEDUC, 2009).

Pichincha	13	15
Total	52	232

Source: FORECCSA Project M&E System (2018)

In the original logical framework of the Project, preliminary measures were proposed and were divided into three types: natural, physical and technological. At local level, during project execution, considering the range of actions implemented, it was necessary to group them to facilitate the monitoring and follow-up. As such, nine types of measures were defined. Below, their impact is described both in terms of climate change and food security:

1. **Community level irrigation:** this measure provided permanent access to irrigation water for vulnerable communities and strengthens the planning, operation, maintenance and management of irrigation systems. In addition, it improved the knowledge on the impacts of climate variability and change for food security. It contributed to the efficient use of water and improved the local availability of food, allowing a constant and stable production, improving the generation of income and influencing a proper consumption of healthy and nutritious food.
2. **Plot irrigation systems:** this measure improved the availability and adequate use of irrigation water in the *chakras*⁷ in areas vulnerable to drought. It improved the availability and consumption of healthy and nutritious food to the family, ensured an improved and stable production throughout the year and improved the generation of income.
3. **Water source protection:** this measure contributed to the conservation and / or management of ecosystems from where the water resource is regulated and provided. Therefore, it improves the provision of water for irrigation and human consumption.
4. **Improved water availability for human consumption:** this type of measure allowed communities vulnerable to drought and with high levels of water pollution to access quality water and improve the water supply for human consumption. With this, the health security corresponding to the food consumption pillar is optimized in the future, specifically in the preparation of food.
5. **Small livestock:** this measure strengthened the rearing of smaller animals (guinea pigs, poultry) as a source of animal protein, contributing to improving nutrition, as well as the generation of income for families living in vulnerable areas to food insecurity caused by the adverse effects of climate change.
6. **Homestead gardens:** this measure sought to promote the production and consumption of vegetables, fruits and medicinal plants, which are key for food security. The combination of different species and systems of agroecological crops, generate integral production systems with greater resistance to extreme climates. The orchards are permanent sources of healthy and nutritious food to consume an adequate diet (availability, consumption and stability), as well as to improve savings and income (access).
7. **Agroforestry systems:** this measure intended to strengthen the incorporation of trees and pastures, which generate microclimates and better conditions to increase animal welfare, productivity and resistance to extreme climates.
8. **Organic fertilizers:** this measure, related to food security, focused on the use of agricultural waste, use of organic fertilizers in crops, applications and differences in costs and their relationship with synthetic fertilizers, and if there are impacts of climate variability.

⁷ Family farm, from the Kichwa term "chakra" which means cultivation land or also the action or activity of sowing something in a plot or homestead garden prepared for it. (MINEDUC, 2009).

9. Seeds: this measure was related to the agricultural system, specifically with the issue of managing species of seeds adapted to climatic threats. However, it was implemented in a single parish, so the baseline was not developed.

Based on the work done by the project team with the GADs and the MAE, the approach for the management of climate change adaptation was directly incorporated in a territorial level planning instruments, types of adaptation measures were established, were designed and were included in the local adaptation plans. These types of measures were organized based on the adaptation approach by communities and ecosystems and based on the concept of adaptation to climate change for food security with gender equality of the project.

Besides, this typology of measures was established and approved based on the technical criteria of the MAE, MAG and WFP as members of the project's national steering committee. Some measures were designed in each parish that were included in the local plans for adaptation to climate change. The description of each type of adaptation measure to climate change for food security with gender equity is shown in figure 2:

Figure 2: Types of Adaptation Measures Implemented Trough the FORECCSA Project

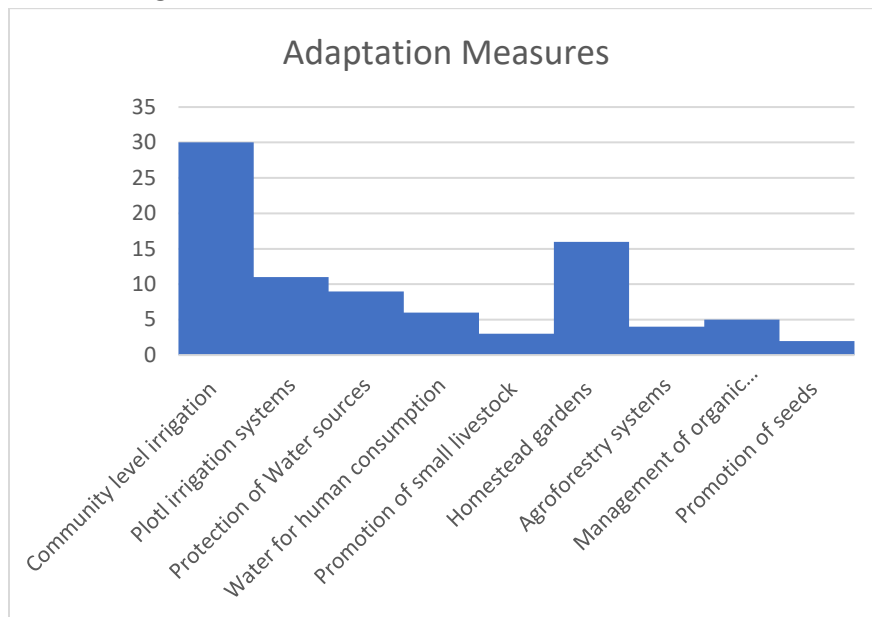
Adaptation measures for food security and nutrition implemented through the FORECCSA project



Source: FORECCSA Project, 2018.

Figure 3 reports the types of measures implemented in the project. In the case of the Jubones river basin, the nine types of measures were executed in the 39 parishes; for Pichincha, only the community irrigation measure was executed in the thirteen parishes where the actions were implemented.

Figure 3. Number of adaptation measures implemented



Source: FORECCSA Project, 2018.

It can be noted that the most common measure implemented is the community level irrigation which addressed a deficiency present in all provinces where the project intervened and is directly linked to drought, the main climate threat. This action allowed to improve the levels of agricultural production and improve the living conditions of the population, contributed to the efficient use of water by improving the local availability of food, which allowed production throughout the year (stability), improved the generation of income (access) and affected the consumption of food. In addition to providing permanent access to irrigation water, the organization of irrigators (Juntas de Regantes⁸) were strengthened to adopt the planning, operation, maintenance and management process of these systems, thus achieving sustainability over time.

The work done through these types of measures was the result of the specific studies carried out (vulnerability studies, adaptation plans and design of measures). In all the parishes, the main climate threat identified was drought. For the Jubones and Pichincha river basin, drought represented the most important threat for the twenty-nine of the parishes where it was worked (85%), while frost was determined as the main threat for three of the parishes (9%); only one parish (3%) registered the main threat as intense rains and anomalous rains. Therefore, adaptation measures were focused on reducing vulnerability to these specific threats.

The homestead gardens had an important contribution in the food security of beneficiary families, as it increased the consumption of vegetables, fruits and medicinal plants, key in their diets. In several cases, there was a production surplus that was marketed and generated savings and income. Although several beneficiaries already had a vegetable garden, they now work to implement good agricultural practices,

⁸ The term “Juntas de Regantes” comes from the definition of Irrigation board, described in the Article 43 of the current Organic Law of Water Resources and Use of Water, Sixth section, Community water management. Irrigation board are non-profit community organizations, whose purpose is the provision of irrigation and drainage services, under criteria of economic efficiency, quality in the provision of the service and equity in the distribution of water. (National Assembly of Ecuador, 2014).

which increase their resilience to climate change. Here it is important to highlight the role of the promoter that had a great impact on the follow-up, in the end it was a requirement from the communities to continue with the permanent technical assistance.

Farm irrigation, including sprinkler irrigation systems, complemented community irrigation measures. These allowed improving access, frequency and use of irrigation of family farms. It contributed to stable production throughout the year and improved income generation.

The protection of water sources contributes to the improvement in the provision of water for human consumption, optimizing future health security corresponding to the consumption pillar in the preparation of food. In addition, it contributes to the conservation and / or management of ecosystems from where the water resource is regulated and provided. This also included measures related with water supply for human consumption, allowing communities vulnerable to drought and located in areas with high levels of pollution to access good quality water and improve the water supply for human consumption, optimizing future health security regarding food consumption, specifically in the preparation of food. This measure involved local organizations (Juntas de Agua⁹), who actively participated in the implementation of this type of measures.

With respect to the production of small livestock, the project recovered and strengthened the breeding of species such as guinea pigs and chickens, which contributed to improve nutrition and income generation of families vulnerable to food insecurity caused by the adverse effects of climate change.

The promotion of “silvopastoral” or agroforestry systems sought to strengthen the incorporation of trees and pastures in land without crops, to generate microclimates and improve animal nutrition. The improvement in quality and quantity of food significantly improved production and this generated an increase in economic income for the participant families, who now manage the pastures and, in some cases, have increased the areas with silvopastoral systems.

All types of measures have had several positive effects in the communities and parishes where they were implemented. In some, several types of measures were implemented at the same time, so the effects are diverse and comprehensive, and the beneficiaries refer to the measures as a set of actions and not individually. For example, as part of the community irrigation type the improvement in water quality has increased by 19% compared to the baseline, which has reached 69% of beneficiaries who have good water quality for their crops.

The project worked in the four provinces, in a total of 52 parishes; of these, 45 have vulnerability studies, 48 plans for adaptation to climate change and 50 adaptation measures were implemented. Table 3 shows the main achievements by type of measure reached by the project:

⁹ The term “Juntas de Agua” comes from the definition of Water for human consumption management board, described in the Article 43 of the current Organic Law of Water Resources and Use of Water, Sixth section, Community water management. Irrigation board are non-profit community organizations, whose purpose is the provision of irrigation and drainage services, under criteria of economic efficiency, quality in the provision of the service and equity in the distribution of water. (National Assembly of Ecuador, 2014).

Table 3: Scope and main achievements of the project by type of measure

TYPE	SCOPE AND MAIN ACHIEVEMENTS
Community level irrigation	<p>It was implemented in 22 parishes in the provinces of Azuay, Loja and Pichincha.</p> <p>The main actions developed were:</p> <ul style="list-style-type: none"> • Construction and improvement of 30 reservoirs that increase water storage capacity by 188.017,00m³ • Improvement of 57,84 km of critical sections of community irrigation channels • Repowering 4 526,14 hectares of productive land, benefiting 3 650 families in dry areas
Plot irrigation systems	<p>It was implemented in 8 parishes in the provinces of Azuay, Loja and El Oro.</p> <p>The main actions developed were:</p> <ul style="list-style-type: none"> • 844 systems implemented and beneficiaries • 229,09 hectares with plot irrigation
Water source protection	<p>It was implemented in 8 parishes in the provinces of Azuay, Loja and El Oro.</p> <p>The main actions developed were:</p> <ul style="list-style-type: none"> • 1 813 families have guaranteed hydrological services by protecting 50 water sources • 19,54 hectares of protected áreas
Improved water availability for human consumption	<p>It was implemented in 4 parishes in the provinces of Azuay and Loja.</p> <p>The main actions developed were:</p> <ul style="list-style-type: none"> • 1 678 families improved their quality of life by having clean water • 5045 m³ of capacity
Small livestock	<p>It was implemented in 3 parishes in the provinces of Azuay and El Oro.</p> <p>The main actions developed were:</p> <ul style="list-style-type: none"> • 433 beneficiaries incorporated the small livestock measure • 4 982 poultry and 1 380 guinea pigs were delivered.
Homestead Gardens	<p>It was implemented in 11 parishes in the provinces of Azuay, Loja y El Oro.</p> <p>The main actions developed were:</p> <ul style="list-style-type: none"> ▪ 2 639 families incorporated homestead gardens. ▪ 399,98 hectares planted. ▪ 26 harvests obtained from the implementation.
Agroforestry systems	<p>It was implemented in 2 parishes in the provinces of Azuay and Loja.</p> <p>The main actions developed were:</p> <ul style="list-style-type: none"> ▪ 336 families incorporated agroforestry systems ▪ 127,25 hectares established ▪ 26 056 forest and / or fruit trees have been planted
Organic fertilizers	<p>It was implemented in 4 parishes in the provinces of Azuay and Loja.</p> <p>The main actions developed were:</p> <ul style="list-style-type: none"> ▪ 847 families incorporated organic fertilizers ▪ 437 900 m² applied organic matter ▪ 5 families implemented vermiculture in farms
Promotion of seeds	<p>It was implemented in the province of Azuay, in the Shagly and Chumblin Parishes.</p> <ul style="list-style-type: none"> • species of seeds adapted to drought were delivered: vegetables, grains and tubers. • 216 families incorporated seeds adapted to climatic threats in their gardens

Source: FORECCSA project, updated to July 2018

Outcome 2.2. Increased capacity at parishes and institutional level to manage climate change risk in the targeted cantons

To achieve this result, the project established a governance model that allowed to reach a total of 72 inter-institutional cooperation agreements between the main project actors: WFP, MAE, MAG and GADPP with the decentralized autonomous governments that became key partners for the implementation of activities at the community level. Governance is defined as as the approach of rules of the game that facilitate the articulation of interests among the different actors involved in order to achieve the established goals." This complex process includes the approach of strategies, implicit and / or explicit, that allow the resolution of conflicts and the construction of consensus.

The model of governance of the FORECCSA project was found to have an important replication potential. The Project allowed local governments to carry out the adaptation actions conceived in the logical framework and ensure sustainability of the adaptation measure; while the Ministry of the Environment provided technical assistance and coordinated the intervention with other ministries and governmental and non-governmental entities to promote actions aimed at reducing vulnerability to climate hazards in the agricultural sector. This model can support the mainstreaming of adaptation and mitigation criteria to climate change in other sectors and territories.

Up to 2018, 72 coordination mechanisms have been generated:

- 33 Letters of approval issued by the MAE to the GAD de Jubones for the presentation of the Adaptation Plan for Climate Change.
- 37 Cantonal or parish resolutions declaring the adaptation to climate change a priority in the parish.
- 8 Letters of agreement between MAE-GAD for the operation of meteorological stations in the Jubones river basin.
- Strengthening and Sustainability Plan (PFSC)¹⁰ signed between the GADPP and the MAG.

On the other hand, to ensure that local governments and key stakeholders at national, provincial and local level could access climate change relevant information, all the information generated by the Project has been shared with all the involved stakeholders, especially with all the local governments. All local government have officially received the information and 22 have used it to update their PDOTs (local government annual work plan), while 37 have developed parish resolutions that declare climate change adaptation with emphasis on food security as a priority. Another mean of accessing information is through MAE's website, where all the product generated through the project are available to the public.

In the final stage of the project, information collected in each of the parishes / cantons was delivered to GADs and members of National Steering Committee, including vulnerability studies, adaptation plans, adaptation measures, sustainability plans and strengthening of closure, quarterly reports on adaptation measures and PFSC, results of the evaluation of the effectiveness of adaptation measures by type, executive summaries of the results of the project (two pagers), videos of the project, life stories, archives of 50 parishes, among others.

¹⁰ Plan de Fortalecimiento, Sostenibilidad y Cierre - PFSC

Finally, the actions taken to mainstream gender in the implementation of the project are also part of this section, although due to the importance of this process, these results are presented as a special section of this report.

3.1 Contribution of Project Results to Ecuadorian Public Policy

One of the main results of the implementation of the FORECCSA project was that its implementation model based on the methodology of adaptation to climate change for food security and gender equity became a key input for the design of the current public policy of adaptation to climate change, not only by the replication of the model in new projects that are under way, but by the articulation with the Decentralized Autonomous Governments (GAD), which incorporated this model into their local planning at a territorial level.

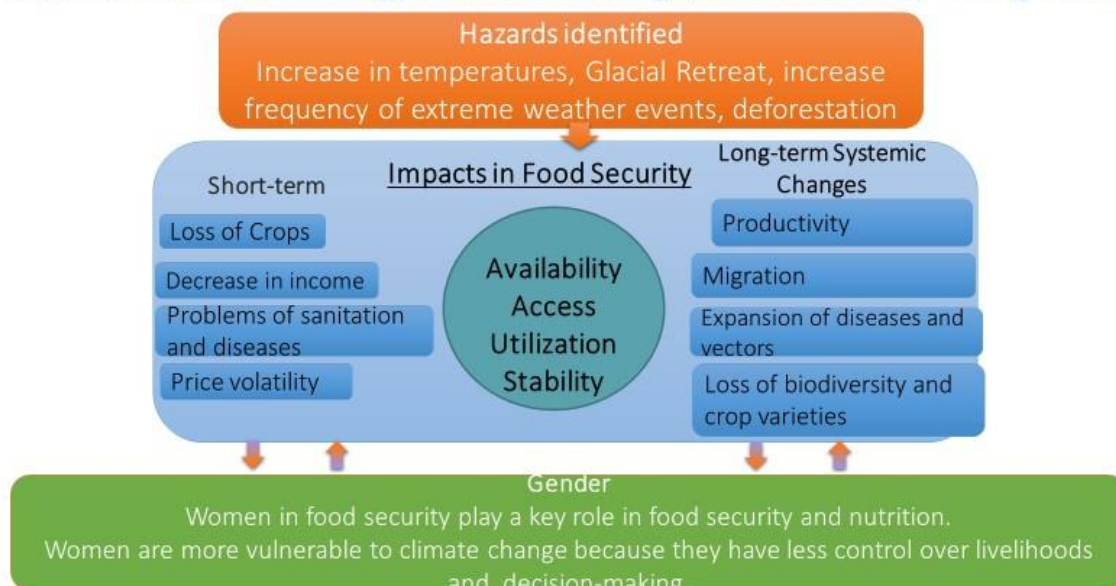
Based on the implementation approach that links the effects of climate change on food security and gender equity, the project team worked for months with MAE and local governments on the adaptation plans and the design of measures to adapt to climate change for security food. In parallel, based on a strategy to mainstream the gender approach in the implementation of the project, training and capacity building was carried out with the beneficiaries, the technical team of the project, the MAE, MAG and GAD. Figure 4 condenses the project implementation model that is a territorial input of the public policy of adaptation to climate change with a focus on food security.

This work was part of the process of preparation, management and approval of local plans for adaptation to climate change and facilitated the MAE to build the guidelines to incorporate climate change into local planning¹¹. Therefore, this work with local governments in the framework of the implementation of the project, represents a key input for the conceptualization of the public policy of adaptation of climate change for food security with a gender approach at the national level.

¹¹ MAE (2014), Explanatory Guide for the application of the General Guidelines for Plans, Programs and Climate Change Strategies of Autonomous Governments Decentralized and the inclusion of Climate Change considerations in the process of updating the PDOTs. SCC, Quito, Ecuador.

Figure 4: Climate Change, Food Security and Gender Implementation Approach

Implementation strategy: climate change, food security and gender



Political Context during the project Implementation

The work of the project team with the local governments to enable the start-up of activities was a pillar to support project ownership in the territory. This was also the key to the arrival of MAE technicians in parishes and communities they had not reached before. In addition, this work was very important to strengthen the stewardship of MAE in the process of preparing local adaptation plans for food security and with a gender approach. The organization of this section starts with the regulations and main policies related to climate change and food security; ends with the analysis of gender norms and policies in force in the first phases of implementation.

Throughout the implementation of the project, interest was generated in continuing work on the variables of climate change and food security, so this was included as a priority in the PDOTs. This process was achieved in 18 parishes of Jubones and 2 parishes of Pichincha, as detailed in Table 16. This is because another important action within the PFSC was to include that the GADs, based on agreements and commitments, issue a resolution in which the adaptation to climate change is declared of parish priority with emphasis on food security and gender considerations and the official presentation of the plan of adaptation for the endorsement of the MAE, accomplishing this activity in 100% of parishes

Table 16: Number of parishes that included the climate change and food security variable in their local planning (PDOTs)

Provinces	Number of parishes
Azuay	8
Loja	8
El Oro	2
Pichincha	2
Total	20

Source: M&E, FORECCSA Project 2018

All these parish plans generated throughout the implementation of the project are very useful and should be shared with other institutions, such as SENPLADES so that, through this organization, it can be included at the public policy level and these processes are sustainable over time. The participatory elaboration of these plans at the community, parish and cantonal levels had a direct impact on the link with the local management instruments. Along the same lines, the parish adaptation plans developed during the implementation of the project are essential tools for the GAD to expand / strengthen / maintain their adaptation measures to climate change.

Another of the important actions within the PFSC towards sustainability was the legalization of irrigation water boards and adjudications. The Project supported this process with SENAGUA. This action has a great impact on the strengthening of the irrigation organizations, in addition to the improved works from the adaptation measures.

Although payment systems for ecosystem services were not implemented, the sustainability strategy through the PFSC in Jubones and the incentive strategy in Pichincha, responded to the needs of the local populations and, at the same time, complemented the intervention scheme to from the measures of adaptation to climate change. This strategy shows the degree of flexibility of the CDN to approve this type of initiatives, which is a little away from the initial proposal, but which goes hand in hand with the reality of Project execution. In other words, this decision is a sign of the need to respect local organizational processes, at the level of parishes and communities.

3.2 Contribution of project results to the international commitments

The development of the project was in line with the Constitution of the Republic of Ecuador (2008), the National Development Plan (2009-2013), the National Plan for Good Living (2013-2017) and the Development Plan for a Lifetime (2017-2021). At the international level, the Project maintained a correlation with the main applicable international agreements.

In this regard, the execution of the Project supported Ecuador's efforts to achieve the Millennium Development Goals MDG 1: Reduce malnutrition and hunger by half by 2015; and, MDG 7: Ensure environmental sustainability, as well as its update, carried out in 2016, represented by the 2030 Agenda and supporting the country's efforts to achieve the sustainable development goals (ODS by its initials in Spanish) No. 2 Zero Hunger and No. 13 Climate Action.

Regarding international agreements and conventions, the most important ones are cited and to which the project implementation directly contributed:

- United Nations Framework Convention on Climate Change (1994). The contribution of the FORECCSA project to the country's commitments to this convention resulted in showing the participatory process of preparation of studies and construction of local adaptation plans during the first phase of implementation. Subsequently, the implementation of adaptation measures for the project that

represented a large part of all the adaptation measures that were implemented in the country was reported to the convention. Every year since the project implementation phase, the main results were reported as part of the country's commitments to the UNFCCC through the climate change policy negotiating team of Ecuador that presented this information as part of the country's progress in adapting to climate change. Finally, the hard data summary results were presented to the convention as part of the NDC proposal that Ecuador is preparing at this time.

- United Nations Convention to Combat Desertification and Drought (1994): from this document it is important to highlight Article 2: *Fight against desertification and mitigate the effects of drought, in countries affected by severe drought or desertification*. The project also contributed directly to the country's commitments to the global convention on the fight against desertification, periodically submitting reports of the results obtained with the adaptation measures related to community and parcel irrigation, as well as the other measures implemented to improve the quality of soil for agriculture. Summary information of the results obtained with the measures implemented to combat erosion, were presented by the delegation of Ecuador to the government of China at the UNCCD meeting in the year 2017. At the end of the project, it was also organized in conjunction with the MAE and PMA an event for the meeting of the convention in Quito, which was attended by international delegates.
- 2030 Agenda and the Sustainable Development Goals (2016)¹²: Goal 5 of this document refers to: *Achieving gender equality and empowering all women and girls*. Objective 13 indicates *Adopt urgent measures to combat climate change and its effects*. Finally, objective 2 aims to *end hunger, achieve food security and improve nutrition and promote sustainable agriculture*. Likewise, during the implementation of the project, the results obtained were periodically presented to the MAE and PMA as part of the project's M & E system, so they were also directed to show the progress of the country in reaching SDGs 2 and 13 that were the objectives to which the project should contribute.

In addition, representatives of the project participated in some events to make the results visible during the first phase of implementation. The main events were: "Forum on climate change and justice", organized by the European Union; "Food Security and Climate" in Ireland; United Nations Framework Convention on Climate Change; USAID workshops, CIIFEN, FLACSO forums, among others.

3.3 Contribution of Project results to the AF objectives

Table 20 shows the results of comparing indicators for objectives, impacts, and goals of the AF with FORECCSA's results presented in the above numerals. As seen, most indicators show an alignment and positive contribution of the Project to the AF's objectives. Based on this, it can affirm that the FORECCSA's accomplishments contributed to target communities increasing resilience to negative impacts of climate change and vulnerability.

Activities implemented by FORECCSA had a special impact over expected outcomes 3 and 5 of the AF's logical framework. Communities benefited from the dissemination of information and increased their

¹² PNUD (2016). Agenda 2030 and sustainable development goals (ODS).

awareness and knowledge of climate change and adaptation measures to its adverse effects. On the other hand, the FORECCSA project made special emphasis on the creation and rehabilitation of ecosystem assets which makes the measure of this indicator highly satisfactory. Finally, the implementation of adaptation measures to reduce food insecurity allowed for a positive impact of expected outcome 6, creating sustainable sources of livelihood and income for the target population. In addition, FORECCSA had a determining contribution to participative inclusion of climate change considerations in development plans of localities where the Project was implemented, as well as for the MAE to carry out actions in territories vulnerable to climate change.

Table 17. Comparison of indicators for the Adaptation's Fund objectives, impacts and goals with FORECCSA'S results

Outcome/Output	Indicator	FORECCSA'S Outcomes
Impact: Resilience for change and climate variability increased at the national, regional, and local levels	Impact Indicator: Number of beneficiaries	13,032 beneficiary families
Outcome 1 Reduce exposure to dangers and threats related to climate change	Indicator 1 Frequent Generation and dissemination of relevant information about dangers and threats to interested parties	12,693 families obtained information
Output 1.1: Evaluations of risk and vulnerability were carried out and updated	Indicator 1 .1 Number of projects / programs that carry out and update vulnerability and risk evaluations	45 vulnerability studies performed
Output 1.2: Target population groups are covered by adequate reduction systems	Indicator 1.2: Number of early alert systems	An early alert system was designed, but not yet implemented by communities
Outcome 2: Increased institutional capacity to reduce risks associated with climate-induced socio-economic and environmental losses	Indicator 2: Capacity of personnel at institutions to respond and mitigate impacts of climate-related events was increased	The capacity of persons belonging to organizations in charge of mitigating climate change events went from low to medium
Output 2.1: Capacity of national and sub-national centers and networks to quickly respond to extreme climate events	Indicator 2.1.1: Personnel trained to respond and mitigate climate-related events	50 persons in organizations in charge of mitigating climate change impacts
	Indicator 2.1.2: Number of target institutions with increased capacity to minimize exposure to climate variability	The number of institutions with this capacity has not been quantified. 32 parishes formulated Plans to Adapt to Climate Change, PACC.
Outcome 3: Increased awareness and appropriation of processes of adaptation and reduction of climate risk	Indicator 3: Adequate adaptation responses application increased	87% of target population applied adaptation measures
Output 3.1: Target population groups actively participate in awareness activities to adaptation and reduction of risk	Indicator 3.1: Percentage of awareness of target population about adverse impacts of climate change and adequate responses	5,077 out of 6,000 persons originally planned, that is, 84% of the target population was made aware
Outcome 4 Increased capacity to adapt of services of the development services and infrastructure assets	Indicator 4.1: Greater response capacity to services of the development sector and changing needs of a changing and variable climate	
	Indicator 4.2: Assets produced, developed, improved or strengthened	, 86 measures aimed at producing, improving or strengthening assets were implemented
Output 4.1: Vulnerable services belonging to the development sector and	Indicator 4.1.1: Number and type of services of the development sector to	

Outcome/Output	Indicator	FORECCSA'S Outcomes
infrastructure assets strengthened in respond to impacts of climate change, including vulnerability	respond to new conditions derived from climate variability and change	Two climate information systems are available, covering the population of 50 target parishes
Outcome 5: Increased resilience of the ecosystem in response to climate change and variability	Indicator 5: Eco systemic services and natural resources assets maintained or improved under climate change and the stress induced by variability	Eco systemic assets were rehabilitated, such as drinking water sources and community irrigation infrastructure in poor conditions
Output 5.1: Vulnerable eco systemic services and natural resources assets enhanced in response to impacts of climate change, including vulnerability	Indicator 5.1: Natural assets protected or rehabilitated	34 km. of hydric conduits rehabilitated
		3,023 hectares of cultivable assets rehabilitated
Outcome 6: Livelihood and sources of income were diversified and enhanced for population in target areas	Indicator 6.1 Increase in the number of homes and communities with safer access to means to survive	12,693 had moderate improvement of safe access to means of survival
	Indicator 6.2: Increased sustainable alternative livelihood and recipients of weather of target population	12,693 persons have the potential for better alternative income from agriculture
Output 6.1: Livelihood strategies for individuals and communities were strengthened in relation to impacts of climate change including vulnerability	Indicator 6.1.1: Number and types of assets to adapt created or enhanced in support of strategies and individual or community ways of life	50 parishes have a strategy to adapt that develops and implements measures included in the 9 categories
	Indicator 6.1.2: Income increase or prevented income fall	Income of target population could have increased according to the first measurement of follow-up of the Project's baseline
Outcome 7: Public policy and regulations were improved to promote and implement measures of resilience	Indicator 7: Priorities of climate change are integrated into the national development strategy	At the parish level, FORECCSA supported the incorporation of adaptation measures to climate change in 20 PDOTs and 32 PACCs
Output 7.1: Resilience strategies were improved and integrated in country development plans	Indicator 7.1: The number of public policies introduced or adjusted to face climate change risks	No legislation was introduced at the national level, however, there were plans at local level promoted by FORECCSA and this played an important role in having the MAE approach the territory with climate change and food security actions
	Indicator 7.2: Number of development strategies with climate change priorities incorporated that were applied	32 local plans with climate change adaptation were approved

Source: ECONOMETRIA, Project Final Evaluation - 2018.

3.4 Project Sustainability

The construction of methodologies, tools and explicit indicators for sustainability, as it was stated in the description of the Project, at the level of payment systems for ecosystem services, was a challenge beyond reach. Therefore, the management proposed a more appropriate strategy that can be adapted to the implementation scheme of climate change adaptation measures and that can respond to the incentives proposed in the Project description.

In this sense, for the parishes of Jubones it was proposed the elaboration of Plans for Strengthening Sustainability and Closure (PFSC). The purpose of these plans was to complement the adaptation

measures implemented; that is, they responded to the specific needs of each parish. The conception of these plans answered the following questions:

1. How to achieve the proper functioning of adaptation measures?
2. How to make the measure sustainable over time?
3. How to ensure that, at the local level, the operation and maintenance of adaptation measures are assumed?
4. How to empower the GAD?

This tool allowed, in some cases, to terminate the adaptation measures in execution, increase the number of beneficiaries in the parishes and allow the delivery of the incentives that were raised in the logical framework, at the beginning of the project. This proposal was approved by the Project Steering Committee in March 2017.

The incentives in the parishes of the Jubones river basin were mainly focused on the delivery of seed kits for orchards, fruit plants, organic fertilizers, parcel irrigation kits, community irrigation infrastructure works and water for human consumption. The beneficiaries did not see this plan as another phase but as a continuity to the implemented measure; that is, a complement. This is how a total of 34 PFSC for Jubones was approved, as detailed in Table 15.

Table 18: Number of PFSC developed and executed in the Jubones river basin

Provinces	Number of parishes
Azuay	16
Loja	11
El Oro	7
Total	34

Source: M&E, FORECCSA Project 2018

For Pichincha, at the 28th meeting of the Technical Committee, it was decided to make a roadmap of activities for the completion of the Project, which would last 97 days. To this end, an inter-institutional commission formed by the MAE, MAGAP and WFP was formed to support the GAD PP.

In this last phase, the delivery of incentives was agreed: metal silos, vegetable seed kits, plot irrigation kits of 250 m² per drip, soil studies; communal nursery with seeds of vegetables, fruit trees and forest plants; kit of animals and subsoiling. The investment made for these incentives was 291 163.09 dollars, which benefited 1,376 families. As part of its technical advisor role, the MAG technicians in charge of the Pedro Moncayo and Cayambe cantons, were responsible for the technical follow-up of the incentives delivered in this province.

Another important contribution to sustainability within the PFSC was the legalization of irrigation water boards and adjudications. The Project supported the process with SENAGUA. This action has a great impact on the strengthening of the irrigation organizations, in addition to the improved works from the adaptation measures. The Project team worked on the organizational strengthening of the relevant boards, to contribute to the sustainability of irrigation systems and drinking water systems, which are

essential for food security. Therefore, the institutions and levels of government that have competencies in irrigation water (SENAGUA, provincial GADs) and water for human consumption (cantonal GADs) should link these achievements with their programs and projects.

In the component of the adaptive capacity of the project, indicators were proposed in four areas: parish, natural ecosystems, institutional and resources. To carry out an analysis focused on sustainability, the key indicators in each area of the adaptive capacity were analyzed. Table 41 summarizes the approaches to sustainability made from the adaptive capacity of local populations.

Table 19: Summary of the sustainability analysis to adaptive capacity strengthening

Indicator	Sustainability Analysis
Parish	
Availability of agroclimatic information	Strengthen climate risk monitoring and prevention systems. The competent institutions are: INAMHI, SGR, MAG and MAE.
Adaptation practices for families	Parochial and cantonal GAD participants of the Project could take advantage of the installed capacity to strengthen and give continuity to adaptation measures. The figure of promoter or parochial promoter is fundamental. The MAG could provide with technical assistance.
Access to agricultural technical assistance	
Natural Ecosystems	
Ecosystem protection initiatives	State institutions and levels of government, with competition in water for irrigation and water for human consumption, should link and expand, within their programs and projects, the achievements and capacity installed by the Project.
Institutions	
Component of climate change and food security in the PDOT	The local governments that incorporated climate change and food security in their PDOTs will be able to carry out adaptation actions from the installed capacity from the Project. For the other parishes, it is expected that the State institutions (SENPLADES, MAE) establish public policies that make viable the execution of these plans.
Resources	
Access to irrigation	The institutions and levels of government (SENAGUA, provincial GAD, cantonal GAD) should link the achievements of the Project with their strategies and programs.
Social services infrastructure	

CONTRIBUTION OF THE PROJECT RESULTS TO GENDER EMPOWERMENT¹³

One of the main added values of the FORECCSA Project was to consider the gender approach as part of its implementation proposal, that is, to conceive the population in all its diversity and understand the differentiated implications of climate change in the lives of men and women, seeking to enhance the results of the intervention and generate equal opportunities for both men and women to access the benefits of the project.

4.1 Gender and Climate Change

The FORECCSA Project was based on the understanding the relationship between climate change and gender is fundamental to promote processes of resilience, adaptation and mitigation of the adverse effects of climate change, which are meaningful and sustainable, and that conceive of equality and social equity as a fundamental human right, present in the national regulatory framework.

As in all human activity, the consequences of climate change are differentiated for men and women according to their roles, functions, responsibilities, status in society, their ability to control and exercise power over natural resources; attributes that are socially constructed according to the biological sex of the people.¹⁴

Those who suffer most from the effects of climate change are the populations in conditions of poverty and vulnerability, because they depend more on natural resources, while they have less means to face these effects; in addition, they are generally located in risk areas. These impoverished populations are composed mainly of women, since, according to estimates, of 1.3 billion people in the world who are in poverty, 70% of them are women (Stock, 2012: 4).

Another expression of the differentiated consequences of climate change for women, lies in the fact that among its effects is the reduction of fundamental resources for life such as water, food and fuel, hence, if we consider that women are in their most responsible for domestic dynamics, for the care and survival of the family, the loss or reduction of these resources, generates greater workload, concern and stress for women; however, it has been recognized that men and boys are less likely than women and girls to seek help in solving stress and mental health problems (WHO, 2016: 20).

Therefore, the relationship between gender and food security is also fundamental. When processes of erosion, deforestation and loss of soil fertility are generated, among others, women are the first to be harmed. In poor rural areas, the cooking of food often depends on obtaining fuel and water, so deforestation and droughts have a negative impact on the lives of women and girls, who are the main ones in charge of getting it for housework and food preparation.

¹³ This section is composed of an excerpt from the article “Mainstreaming and gender empowerment in the FORECCSA Project: Strengthening the resilience of communities to the adverse effects of climate change with emphasis on food security in the province of Pichincha and the Jubones river basin” by Rojas, J y Calderón, E (2018); that summarizes the process of gender mainstreaming and empowerment in the framework of the implementation of the project.

¹⁴ FAO. 2018. Vocabulary referred to gender, see in: <http://www.fao.org/docrep/x0220s/x0220s01.htm>

In terms of food security, it has been determined that if women had the same access and power over land and resources for production that men have (raw material, seeds, tools, technology, credit), more and more would be produced. Furthermore, if women were not subjected to the consequences of climate change in their lives and in agriculture, they would have more time to devote to improving the food security of their families. It has also been proven that when women get some income of their own, such as selling their garden products or the small animals they care for, these incomes are reinvested in the household diet or in the education of their children, and in general in the welfare of the family. (FALCONÍ, 2015: 17).

From another perspective, women contribute less to climate change than men, since they are the ones who bear its effects and face them from their ancestral knowledge of the use of resources and their ability to face crises and move their home forward. Worldwide, natural disasters such as droughts, floods and storms take the lives of more women than men, especially young girls. These effects also depend on the type of phenomenon and the social condition (WHO, 2016: 3).

4.2. Scheme of incorporation of the gender approach in the implementation of an adaptation to climate change project with food security approach

FORECCSA has been a pioneering project in Ecuador about climate change since it was conceived from its formulation with a gender perspective. For this, it was proposed to make visible the specific relationships established by men and women with their environment and the effects of climate change, as well as their role in terms of food security, based on the assumption that the introduction of the gender approach will improve and it will enhance the results of the project, but above all it will generate greater equity for women and benefits for all. To this end, FORECCSA has worked from the following programmatic lines:

- Generation of a guiding strategy to mainstream the gender approach.
- Production of studies, diagnoses and intervention proposals to introduce the gender approach in the project.
- Consideration of the gender approach in the preparation of vulnerability analysis, plans and adaptation measures.
- Training and awareness on the gender issue to promote and strengthen a common proposal.
- Definition of specific goals to be achieved within the term and scope of work in terms of practical and strategic needs of women.
- Technical assistance and support from UN Women for the introduction and application of the gender approach.
- Development of tools and mechanisms to introduce the gender approach and improve the participation, status and position of women.
- Monitoring and evaluation system with a gender approach.
- Systematization of experiences and successful cases on the relationship between climate change, gender and food security.

The most relevant aspects of each programmatic line are described below:

4.3. Generation of studies, diagnoses and proposals to introduce the gender approach in the project

In the absence of information and the need to know the situation of men and women and gender relations that are established in the intervention area, as well as propose specific actions in accordance with local realities, the project developed the following products:

- Design of a strategy to mainstream and institutionalize the gender approach in the FORECCSA project (MAE-MAGAP-PMA, 2012), with the aim of contributing to the reduction of inequity gaps between men and women in the beneficiary communities, through interventions that revalue and strengthen women.
- Diagnosis of the local dynamics of gender in the territories of implementation of the FORECCSA project (MAE-MAGAP-PMA, 2013).
- Gender baseline on the social and cultural dynamics of the basin and the particularities to consider working on the gender approach in the project.

At first, the "Gender Mainstreaming and Institutionalization Strategy" was developed in 2012 for the two intervention zones of the Project: Jubones and Pichincha. It was developed as part of an individual consultancy, under the monitoring and technical advice of UN Women. The study was conceived with the purpose of promoting the effective treatment and application of the gender approach in the FORECCSA project, as part of the reduction of vulnerability to climate change and as a way of contributing to the appropriation of adaptation measures, taking consider the gender inequality gaps existing in the communities.

In this document, gender action lines were proposed that are linked to the national policies of adaptation to climate change and, at the same time, indicators were proposed to be integrated into the logical framework of the Project. This strategy was used in the planning and development of the components, both in Jubones and in Pichincha. Subsequently, the "Diagnosis of local gender dynamics" was carried out, which was a study prepared in 2013 in some parishes of the intervention areas of the Project, as part of a consultancy with the Randi & Randi Group Corporation (CGRR), under the monitoring and technical advice of UN Women.

This diagnosis included some products; In one of them, a quantitative analysis of the main socioeconomic gaps in gender equity was carried out. Another product included a qualitative diagnosis of food security and climate change from a gender perspective, based on ten case studies, which included four parishes in Pichincha¹⁵ and six parishes in the Jubones river basin¹⁶ (CGRR, 2018: 49).

In the framework of the initial phase of diagnosis, studies and plans for the Project, it should be noted that in the final process of systematization of all the actions carried out by FORECCSA, the contribution was considered remarkable, since the visibility of gender gaps In the area of food security in interaction with climate change, it was proposed as an interesting approach that contributes to the existing

¹⁵ In Pichincha, it included the parishes: Olmedo and Santa Rosa de Cusubamba of the canton Cayambe; and Tupigachi and La Esperanza of the Pedro Moncayo canton.

¹⁶ In Jubones, it included the parishes: San Pablo de Tenta and Manú of the Saraguro canton, province of Loja; Cañaquema and Uzhcurrumi of the Pasaje canton, province of El Oro; and San Rafael de Zharug of the Pucará canton, province of Azuay.

information gaps in the country, especially in the interaction of climate change and gender. These inputs are necessary elements to make feasible local management tools that integrate the gender approach. (CGRR, 2018: 163).

4.4. Consideration of the gender approach in the vulnerability analysis, plans and adaptation measures

Within the framework of the second objective of the project, an expected result was to increase the adaptive capacity and resilience of vulnerable communities and ecosystems. To achieve this, specific adaptation measures were designed, based on parochial adaptation plans. The plans have been formulated based on a vulnerability assessment of livelihoods and food security in the face of the adverse effects of climate change.

The FORECCSA Project implemented a total of 86 adaptation measures that were grouped into 9 types: protection of water sources, silvopastures, parcel irrigation, community irrigation, seed promotion, promotion of family gardens, management of organic fertilizers, water for human consumption and promotion of small animals. In the case of the Jubones river basin, the nine types of measures were executed in the 39 parishes; for Pichincha, only the community irrigation measure was executed in the thirteen parishes where the actions were implemented (CGRR, 2018: 84).

The development of these studies considered participatory and gender elements in their formulation, to approximate the interests and needs differentiated by men and women. The gender aspects are deeply rooted, vary considerably between cultures and within them, and change over time, however, in all cultures gender determines the power and resources available to women and men.

The project took important steps in the understanding of gender relations for the generation of the studies in 11 parishes of Pichincha and 34 of Jubones, however, the gender approach is not equally present in the development of the plans and measures of adaptation of the different parishes. For this reason, a strategic alliance was created with UN Women, through which a gender expert joined the team to strengthen the actions and activities for the implementation of the approach in the measures that were executed, which were They are detailed in the following sections.

4.5. Training and sensitization on the gender issue to promote a common proposal

The introduction of the gender approach involves a process of sensitization and training of the technical team of the project, so that they can understand the importance of this perspective for their work and acquire the necessary knowledge to handle concepts and operational tools. To this end, a training plan on gender was carried out for the technicians of the FORECCSA project, addressed to the technical team of the Ministry of the Environment (MAE), the Consortium of the Jubones River Basin and to the local promoters belonging to the Governments Decentralized Autonomous (GAD), as project counterpart. The training plan was a theoretical-practical proposal addressed to the project managers, for their leading role in guiding the execution and the multiplying potential of said knowledge through the technical team. The plan began its implementation in August 2015 and lasted until the beginning of 2016, its main training strategy was workshops and field support to apply the knowledge acquired.

This Plan was also developed within the framework of the alliance with UN Women and was developed with the purpose of promoting a process of approximation, appropriation and application of the gender approach in the Project, through the development of knowledge, skills and abilities of the team. technician in charge of executing and monitoring the progress of activities. At the same time, it sought to provide the team with tools for the practical application of the gender approach. Based on this plan, in 2015 a training process was developed for the Project's technical staff, precisely with the intention of improving their performance in the inclusion of the gender approach. The thematic content and the methodological approach were built according to the needs of the personnel in charge of technical assistance and accompaniment in the implementation of adaptation measures in the parishes of the Jubones river basin (CGRR 2018: 66).

4.6. Technical assistance and accompaniment of UN Women for the application of the gender approach

As a strategy to strengthen the application of the gender approach in practice and recognizing that this topic requires specific knowledge and expertise, a gender expert was included in the team to support actions such as the mainstreaming of the approach in all measures of adaptation to change climate that implements the project, both at the theoretical-methodological level and in the field; as well as the investigation and analysis of the differentiated effects of the application of the gender approach in the different measures. This consultancy was developed in coordination with UN Women and was focused on the parishes of the Jubones river basin, with the intention of replicating in the province of Pichincha.

In the same way, within the framework of this strategic alliance, some of these actions and activities that were carried out for technical assistance and accompaniment to the technical team of the MAE to mainstream the gender focus in the implementation of the project were:

- Generate a gender training plan for technicians and technicians of the FORECCSA Project.
- Baseline of the Jubones river basin from a gender perspective.
- Methodology for operational research on the differentiated effects of gender mainstreaming.
- Proposal for the incorporation of the gender approach in the measures of adaptation to climate change.
- Monitoring report on the accompanying activities for the incorporation of the gender approach.
- Summary of the incorporation of the gender approach in the adaptation measures to climate change by parish.
- Accompanying plan for the incorporation of the gender approach.
- Methodological guide for the mainstreaming of the gender approach in the practice of projects.
- Documentation, analysis and systematization of lessons learned and good practices to provide feedback on the exercise in other territories.

4.7. Development of tools and mechanisms to introduce the gender approach and improve the participation, status and position of women

As part of the implementation of the project, the development of methodologies and tools that enable the techniques and / or linking in practice the gender, climate change and food security approaches was considered. These tools served to:

- Understand the roles, functions and actions of men and women in the face of climate change and food security.
- Analyze the exercise of power and the processes of control and decision making.
- Promote the participation and empowerment of women in the project.
- Understand and link the relationship gender-ethnicity-age, because the groups with which they worked belonged to different age groups and ethnic identities (mestizos, indigenous Kiwchas and Saraguros).
- Introduce the gender approach in the planning, execution and evaluation of projects, proposals and indicators of climate change and food security.

In addition, the tools to mainstream the gender approach developed for the project, within the framework of UNW's technical assistance, such as the methodology for operational research and the proposal to incorporate the gender perspective in adaptation measures, were key during the implementation, not only for its usefulness in making decisions, but also when empowering the technical team in concepts and techniques, since they responded accurately to the components initially established in the project.

4.8. Monitoring and evaluation system with a gender approach

The Project developed a monitoring and evaluation system that is currently being led by the MAE teams in the intervention areas. The monitoring and evaluation system was designed from the beginning of the project and the indicators were evaluated with a gender perspective, the data were always disaggregated by sex and by socioeconomic group.

For the mainstreaming of the approach to encompass the integrality of the project planning cycle (planning-execution-monitoring), the system included indicators and concrete tools for monitoring with a gender perspective, during all the key phases of monitoring and evaluation. of the implementation of the project:

- Project Startup Workshop: this event marked the start of project activities and was key to subsequently obtain baseline information on gender.
- Annual Progress Report: annual report document to the Adaptation Fund, which included specific information on lessons learned and project indicators with a gender perspective.
- Mid-Term Evaluation: this evaluation is carried out halfway through the implementation of a project approved by the FA and in the case of FORECCSA, it sought to measure the effectiveness, efficiency and timeliness of the implementation, highlighting actions, decisions and lessons learned on the design of the project
- Final Evaluation: this evaluation is carried out to identify and value the contribution of FORECCSA to the increase of the resilience of the beneficiary communities in the face of climate change, reduction of the greater moon food insecurity in these populations and in the adequate handling of the challenges of gender.

In this framework, one of the main results of the final evaluation and systematization was that In Table 18, referring to the results of gender indicators, it can be noted that the production of food at home at the beginning of the project was under the care of women with a representation of 70% while, after implementation, although the woman is still responsible for this activity, her responsibility has been reduced to 51%, sharing her responsibilities with her partner (CGRR, 2018).

Table 18: Results of the gender indicators

Aspect	Baseline	Post implementation
Production of food at home	70% Woman	51% Woman
	4% Man	9% Man
	26% Both of them	40% Both of them
Support in the food production	32 % Woman	23% Woman
	17 % Man	31 % Man
	51 % other	46% other
Strategies to get food	22% Woman	62% Woman
	76% Man	34% Man
	2% Both of them	4% Both of them

Source: FORECCSA, baseline results vs post-implementation (July 2018)

For the support in the production of food, the participation of men has increased to 31% and the participation of women has decreased to 23% which indicates that, thanks to the project and the training carried out, the man has had a more active participation, generating a greater commitment in the production of food both at the family level and for sale. Finally, at the beginning of the project, the responsibilities of generating strategies to obtain food were mainly carried out by men with 76%; after implementation, women have taken 62% of the responsibility to get food.

At general level for the mainstreaming of the gender approach in the project, the monitoring and evaluation (M & E) system was key to follow up on the indicators designed with a gender perspective, as well as to collect lessons learned and manage this knowledge focused on improve the implementation of adaptation measures in the intervention communities through better planning.

4.9. Final reflections and conclusions

The FORECCSA project posed the challenge of incorporating the gender approach in practice. To make this possible, it joined political will and acted at a strategic, theoretical and practical level. At the strategic level, it promoted an alliance with UN Women to direct a process of mainstreaming the gender approach during all phases of project implementation; in terms of political will, it allocated resources, personnel, time and work to orchestrate this goal.

At a theoretical level, it has developed studies, research, diagnoses and work proposals; and, on a practical level, it began with the generation of tools, methodologies and indicators adapted to the logic of the project and the area of intervention, and after the project has been closed, knowledge management on good practices and lessons learned has been planned. been harvested after years of implementation.

In this pioneering process, the project worked to create its own methodology that links gender and adaptation to climate change for food security, which is expected to contribute to strengthening the achievement of the expected results. For this reason, this methodology is expected to be shared later with other similar initiatives, through processes of systematization, training and exchange of experiences.

The FORECCSA project at the end of its implementation registered a total of 19,356 beneficiary families, belonging to 240 communities of 40 parishes and 12 cantonal head offices in the 4 provinces of intervention; At the parish and cantonal level, 49 vulnerability studies were carried out, 49 adaptation plans and 86 adaptation measures. However, for the present article the key fact is that in the initial phase, the project raised information regarding the roles of women and its importance in family food security, information was collected in 2300 households in 2 stages, before project implementation and post implementation.

In this sense, the indicators showed that depending on the type of adaptation measure implemented, the man increased the time dedicated to the activities of the farm, reducing the workload of the woman and aimed at managing gender equity. roles that women and men have in: protection of water sources, management of silvopastures, management of efficient use of community and plot irrigation water, maintenance and sustainability of the agroforestry garden and incorporation of organic fertilizers, management of small animals as a source of animal protein and strengthening of drinking water boards.

Finally, the implementation of the FORECCSA Project demonstrated that the reduction of vulnerability to climate change requires that actors such as the environmental and agricultural authority carry out an institutional coordination with other key entities such as UN Women. In this way, it is possible to plan and execute joint interventions for the benefit of peasant family farming and food security with a gender empowerment.

LESSONS LEARNED

5.1 Processes and Operations

- The approval of the project by the State institutions resulted in a duplicity of logical framework formats: one for the donor and another for the State planning institution (SENPLADES). This process required additional work that had not been foreseen in the design of the project, which generated a significant delay in the start-up of actions. Therefore, for future projects with similar characteristics, it is necessary to foresee all the regulatory and administrative requirements in the design and, at the same time, allocate sufficient time and some budget for unforeseen events.
- In the initial phase (2011-2013), the project representatives underestimated the time necessary for the generation of internal regulations, definition of roles, coordination spaces and methodological procedures, essential aspects in innovative projects such as FORECCSA, with a diversity of social actors. This situation was reflected in delays in the implementation of actions and, consequently, in a reputational risk for the project. Consequently, for future projects it will be essential to agree and define, from the beginning, a management model among the actors involved.
- The organizational weaknesses of the CCRJ, added to the drawbacks of the management model in the first phase of the project, led to implementation problems, which resulted in significant delays and discomfort of the local populations. Situations such as these could be predictable, detectable and manageable in future projects, by implementing clear management and monitoring procedures that allow the timely determination of the performance of the participating actors, as well as the level of progress in management and implementation.
- The permanence of the project team constitutes a strength in the management and implementation of activities. However, institutional dynamics, depending on different political, regulatory, economic and administrative factors, affect the rotation of personnel participating in projects. For this reason, it will be necessary that the institutions, in this case the SCC of the MAE, develop procedures for an effective management of knowledge that allows to counteract some difficulties that the rotation of personnel represents, in order to maintain a smooth management of projects.
- The interinstitutional coordination between MAE and MAG constitutes an important advance in terms of the mainstreaming of climate change in the agricultural sector, particularly in small and medium production. At the same time, complementarity with the food security approach provided by the WFP made it possible to establish a comprehensive intervention. These articulations took place in areas of agreement such as the TC and the CDN. This experience constitutes an important reference for a future joint construction of policies between MAE and MAG, which aim at reducing the vulnerability of the agricultural sector to climate change.
- To overcome the governance problems raised in the first (2011-2013) and second (2013-2015) phases of the project, the representative actors developed a diversity of mechanisms and tools that facilitated the implementation of activities. In other words, the innovation capacity of the project team was remarkable in order to adapt and overcome the difficulties that arose along the way. In this regard, for future projects with similar characteristics it is important to recognize the need for innovation and flexibility in the management and implementation, especially of those projects that involve major administrative, technical, operational and logistical challenges.
- From the third phase (2015-2018), it is essential to highlight the strategic alliances that were formed, especially between the MAE and local governments. The closeness of the project team to local

populations and the coordinated work with local governments was an excellent example of the coordination and articulation of interests. The creation of the figure of promoter and parish promoter, as a contribution of the GAD, was a great success for the participative achievement of the established goals and, above all, for the recovery of the trust of the people. Therefore, this performance must be analyzed, and the learning transmitted between the SCC of the MAE, to strengthen its management in the management and coordination of future projects with similar characteristics.

- The direct relationship of the project team with local populations, whether for research or implementation, is a fundamental element to be able to articulate and establish agreements with local and national actors. Only in this way can agreements and consensus be reached that facilitate the implementation of public policies, especially in the field of climate risk prevention.
- The technical and financial strengths of GAD Pichincha, as well as its great leadership and commitment to local populations, made it possible to carry out the actions proposed in the FORECCSA project from the point of view of its territorial planning. In turn, the principle of co-management with local communities was the central axis for the fulfillment of the established goals and to motivate the sustainability of the achievements. This management model led by GAD Pichincha and its articulation capacity allowed to overcome some differences that were presented with the rest of the actors in the initial phase of the Project (2011-2013). Therefore, the incidence and linkage of local governments with rural populations, as is the case of GAD Pichincha, represents the essential mechanism for channeling climate change and food security policies within the framework of the different rural contexts of which Ecuador is made up.
- WFP, as a Multilateral Implementation Agency, effectively fulfilled the roles assumed and, additionally, supported strategies to overcome implementation gaps. In this last aspect, it is important to highlight the level of transparency in the budgetary management scheme in charge of the WFP, MAE and GAD Pichincha, which contributed to the credibility of the project on the part of the beneficiary local populations.
- WFP based on its mandate to strengthen community resilience to address hunger, promoted the conceptual framework that links the effects of climate change on food security and the livelihoods of the most vulnerable populations prioritized by FORECCSA project at the national level.

5.2 Monitoring and Evaluation (M&E)

- The project, through time, generated a large amount of relevant information that was recorded in an organized manner in the monitoring system. It is important, for similar projects, to build tools that record this information and that have as their purpose the generation of reports for the socialization of results to key actors and decision makers.
- In projects with the complexity, dimension of execution and analysis, as is the case of the FORECCSA project, enough technicians must be considered to contribute on different fronts of the project execution to ensure that there is no overload of work and that the actions identified at the planning stage can be carried out.
- For the construction of the tools and the methodology to be implemented in the monitoring system, the technical team in charge of the execution of the project should be considered, since they have a greater vision and clarity of the actors and axes to be monitored.
- The identification of the axes of analysis and the development of the monitoring system should be planned in the first phases of project execution, so that there are no gaps in the collection of information

and the monitoring of the logical framework. It should not be left as a complementary theme for their development when the project has progressed in its execution.

- An initial analysis of the logical framework of the project should be carried out to define the horizontal and vertical logic of the project and, based on this, develop the monitoring plan and the monitoring system tools that respond to the indicators, results, goals and objectives.
- There must be a flexible monitoring system that evolves and adapts to the requirements presented in the implementation of the projects, focusing on the processes of change for adaptation, rather than on indicators.
- The monitoring system must be an instrument that has as a final result reports that favor the generation of knowledge and decision-making at the level of public policies related to climate change and food security.
- For the SAGRC to be operational, it is necessary the participation of the actors in the territory for the development, implementation and decision making; in this way the sustainability of the same will be achieved.

5.3 Strategy, governance and policy

- In the first part of the project, until 2014, work was done on the preparation of vulnerability studies, adaptation plans and profiles of adaptation measures, which were very valuable for the project execution. However, this time could be used to implement the measures with the beneficiaries, either in the processes that needed management, negotiations or time to execute other innovations that emerged from the beneficiaries' experience.
- The approval of the adaptation and execution measures was carried out as of 2014; this generated discomfort in the beneficiary populations and required the work of the local team. As a lesson learned there should be a sequence between vulnerability studies, plans and the implementation of the adaptation measure so as not to lose the socialization and awareness process initiated during the study phase.
- The procurement process from WFP was a strategy of the project to streamline the processes of implementing actions. For future executions it will be necessary to define from the beginning the institutions responsible for this process, to facilitate the adequate execution of actions. In addition, the time required for the administrative-financial processes should be foreseen, depending on the type of project and the implementation agency with which it is being worked. That is, its execution capacity should be analyzed in terms of procurement and hiring processes to avoid delays in the implementation of projects with similar characteristics.
- The management of nine types of adaptation measures generated a range of actions to be carried out. This, added to the distance between the communities and the parishes, causes the dispersion of the impact generated by the project. In the future, the effort could be concentrated in two or three types directed by zones (high, medium and low) to generate greater results at the territorial level.
- The incorporation of gender considerations refers to the fact that the project will identify the gaps and promote the improvement of the capacities, mainly of women, to participate and make decisions in relation to the actions that are carried out, linked to the adaptation to climate change and food security. This point presented problems to be executed due to the complexity of the topic; looking to other

opportunities, it is necessary, besides having a plan, to have a specialist in the theme that accompanies throughout the process (from the conception of the project and its execution) and can generate tools to achieve gender mainstreaming in the different levels of the project (administrative, local and managerial).

- Ongoing training throughout the project, through theoretical and practical workshops (learning by doing) through the principles of adult education (andragogy), generated the best results; therefore, the replication in similar projects will strengthen the participants' capacities in topics such as climate change, food security and gender. It is necessary, as a complement, that the training instruments be prepared before implementation to generate strategies that strengthen this process.
- The role of the parochial GADs (promoter), assuming commitments and contributions, together with the counterpart of the beneficiaries, led to the successful implementation of the adaptation measures. Considering the roles of these actors, their points of view and needs for similar projects will facilitate the process of implementation and appropriation from the territory.
- The parish plans generated throughout the project are very useful and should be shared with other institutions, such as SENPLADES, so that, through this organization, it can be included at a public policy level and these processes are sustainable in time.
- The work in the preparation of documents such as vulnerability studies, adaptation plans to climate change and prioritized measurement profiles, in a participatory manner, constitute an important basis to start the implementation work, which includes, in addition to the criteria of the project, those of the beneficiary populations.
- To give a level of sustainability to the actions implemented in the parishes, it is necessary to look for tools that contribute to the strengthening of the actions over time while leaving installed capacities. To this end, the project created the PFSC tool, which included several complementary actions to the measures; nevertheless, the most relevant were the inclusion of the criteria of climate change and food security in the PDOTs and the approval of the plans for adaptation to climate change by the MAE, aimed at sustainability in the territory.
- In a project related to climate change, it is important to have climate information at the level of parishes; For this reason, the project raised the need to obtain information at this level, and one more step was that this information may be available to the producers, who are the ones who need this information. The initiative in Jubones was translated into a platform that will be fed by data from several meteorological stations and, in the future, will be available to the public; in the case of Pichincha, support was given to the extension of the weather station. These initiatives will contribute to having data for the generation of new tools in the agricultural sector.
- The specific documents cited, and the tools generated throughout the project focused on strengthening the resilience of the vulnerable populations of the 52 parishes. In future interventions with similar themes, it will be necessary to maintain joint work with local governments, both at the level of actions, as well as at the level of knowledge management, to leave installed certain capacities in local populations.
- In the case of Pichincha, to the GAD PP, COOTAD assigned it competences, within which it is responsible for the irrigation activities. These activities have an established planning in the environmental and irrigation plans. Thus, the activities planned within the Project were framed in these components, generating a coalition that allowed greater scope at environmental and social level.
- The GAD PP has an installed capacity (technical equipment and machinery), which helped to establish the measures. On the contrary, in Jubones, the Project had to identify the GADs interested in working on the process, which delayed the implementation of the measures.

- For all types of projects, the time required for closure must be foreseen, that is, allocate resources for the technical personnel in charge, as well as for the generation of procedures. This situation is fundamental for projects such as FORECCSA, which have many agreements with local governments, which must be closed from a technical and legal point of view.

5.4 Diagnostic, studies and plans

- From the beginning of the project, the representatives in charge raised the need and importance of having studies at the macro level and specific studies at the local level that allow guiding the fulfillment of the established goals. The intention, in addition to knowing the evolution of the indicators related to climate change, food security and gender, was to contribute in the design of management tools that are effective and appropriate to the different realities in which the Project intervened. Although the volume of information generated was quite high, it is essential that in future projects with similar characteristics, at least, allocate a period and resources to carry out local diagnoses that allow the development of comprehensive feasibility analyzes prior to the intervention.
- The FORECCSA project represents a sample of the link between scientific knowledge and local perceptions in the construction of a methodology for vulnerability of food security to climate change. That is, in this process the contribution of local populations in the participatory construction of knowledge was recognized. Therefore, it is essential that in future projects with similar characteristics, the study of local perceptions be deepened as a participatory tool to characterize climate threats and strengthen local capacities in adapting to climate change and food security.
- The contribution of the project in terms of studies and gender diagnoses, both at the macro and local levels, is remarkable. At the same time, the visibility of gender gaps in the area of food security in interaction with climate change is considered as an interesting approach that contributes to the information gaps that exist in the country, especially in the interaction of climate change and gender. These inputs are necessary elements to make feasible local management tools that integrate the gender approach.
- The project representatives, after several trials, demonstrated that early warning systems operate from the emerging response to climate risks, so they decided to focus on strengthening information inputs and supporting the development of systems that work from prevention. In this sense, GAD Pichincha proposed the extension of the coverage of the meteorological stations of the cantons of Cayambe and Pedro Moncayo. This proposal will have a direct impact on the improvement of knowledge and characterization of climate threats.
- The climate risk management system for food security in the Jubones river basin, built in the Project, constitutes an innovative proposal regarding the analysis and interaction of information as an input for decision-making at the local level. The system employs the most relevant elements of food security in correlation with the main climatic hazards that occur in the basin in order to motivate and facilitate prevention actions in local governments. Although with the FORECCSA project it was possible to establish a virtual platform of the system and the interinstitutional articulation was proposed, it is indispensable that, in future projects of similar characteristics, the management model that allows to support risk prevention measures can be defined and strengthened. the local level.

- The large number and diversity of studies generated in the development of the Project should form a database available to the public interested in these issues. The wealth of information generated must be added to other learning developed by the SCC of the MAE, MAG, WFP and GAD, as well as specialized academic institutions, as a way to contribute to the understanding of the risks associated with climate change and food security from the of genre.

5.5 Contribution to sustainability

- The agreements made with the parochial and provincial GADs have had a positive impact on the intervention areas of the project, since many of them were empowered by the process and made significant contributions, as well as the inclusion of the topics of climate change and food security in the PDOT.
- In projects that work on topics such as food security and climate change, it is necessary, before starting the implementation, to have detailed information on the work areas. In the case of the FORECCSA project, the information provided by CEPAR and the vulnerability studies oriented to make visible that the biggest problem, in the case of food security, was the pillar of availability. Therefore, the Project worked mainly in this pillar, yielding positive results for beneficiaries and beneficiaries. For this reason, the sustainability scheme could be completed by strengthening the rest of the pillars of food security.
- For future projects with similar characteristics, the social organization at the local level must be respected and the logic of diagnosis, planning, implementation and monitoring of the defined actions must be maintained, as developed in the FORECCSA project.
- The actors participating in the project (MAE, MAG, WFP, GAD) demonstrated that working in strategic alliances with local governments, State institutions and civil society organizations is a fundamental element for sustainability, since it allows the spectrum to be extended of analysis of the problems and opens the possibility to the generation of synergies.
- In accordance with the unified methodology of vulnerability analysis, one of the ways to promote the sustainability of the achievements of the Project would be to strengthen the adaptive capacity of the beneficiary populations. For this, work should be done on the rest of the indicators in the areas: parish, natural ecosystems, institutions and resources (access to credit, hydrometeorological monitoring, access to irrigation, social services infrastructure).

CONCLUSIONS OF THE FINAL EVALUATION

The conclusions of FORECCSA'S evaluation are based on evidence and findings of the current assignment. The main conclusions are related to the effective accomplishment of the outcomes set forth in the project's design. There are also conclusions about the process, the quality of the M&E systems, future sustainability of accomplishments, alignment with the goals of the Adaptation Fund, and management of gender challenges.

Before examining each of these aspects, the evaluation proposes as a overall conclusion that FORECCSA achieved a satisfactory result in meeting the goals and objectives of the logical framework under which it was designed. Results show that not only did knowledge of the effects of climate change on food security increase among beneficiaries, communities, and authorities, but an effective contribution was made to reduce food insecurity and improve resilience to the effects of climate change in communities where it was implemented.

It should also be noted as a general conclusion that FORECCSA, due to its innovative design and scope, was like a laboratory that in addition to its accomplishments contributed important lessons for the country. During its implementation period, effective solutions to problems encountered in the way were gradually found. There is also the presence of unexpected effects of different socio-economic issues such as gender equality. Lastly, it is confirmed that FORECCSA's achievements did fall in line with the objectives of the Adaptation Fund.

Below are the main conclusions on each of the evaluation subjects requested by the AF and the WFP.

6.1 Effective achievement of expected objectives and outcomes of the project

- Impact on greater knowledge and incorporation of institutional measures for climate change. The Project promoted and facilitated parish governments to include priority assistance to climate change threats focused on food security in their PDOTs. This action was complemented with active participation from the authorities and local communities in formulating Parish Plans to Adapt to Climate Change (PACCs), which were approved by the MAE in 2017-2018. This achievement is significant because although there are national level policies and strategies to adapt to climate change based on pillars of food security, FORECCSA paved way for these policies to arrive, be discussed, and adopted at local level.
- Effectiveness: In general terms it is concluded that, despite the effective implementation time of the measures being short (18 to 24 months, after a long process of consultation and participative definition), the degree of achievement of the goals set for each outcome and their products in the Project is high in most indicators set forth in the logical framework. Also, when examining the accomplishments after the first follow-up in relation to the baseline for each of the implemented typologies of measures, early outcomes are encouraging. The availability of water for community and parcel irrigation increased for beneficiaries; new technologies such as aspersion and drip irrigation, production of organic fertilizer and support to family orchards were implemented and resulting in increased production and additional income from the surpluses sold at markets.
- Relevance: The Project, after verifying that the main effect of climate change in most of the 50 selected parishes was the lack of water, defined, with the participation of local authorities and communities, that

irrigation was a priority need and worked mainly on this. Irrigation was implemented in 26 parishes, 52% of the total corroborating that community and parcel irrigation were the most accepted, required, enabling and enhancing measures. On the other hand, it was found that the typology that generated the most individual awareness to reduce food insecurity and therefore effective implementation and empowerment of outcomes, was family orchards.

- High valuation given by beneficiaries to global accomplishments of the Project: As a result of the evaluation's field work and through consultation in focus groups, a random sample of beneficiaries in the four provinces intervened by the Project, it is concluded that most consider FORECCSA meant a great contribution to its productive activities, although they do not feel fully trained to adequately face the risks of climate change. Additionally, they state they are fully satisfied with their participation in the decisions made in the Project. 77% of beneficiaries rated the outcomes as very good. Regarding the rate for greater knowledge of the risks of climate change especially in relation to food security, 34% consider there is very good knowledge and 44% as good. 20% rate it as regular and 2% as poor.
- Unexpected results: A first qualitative appreciation based on interviews and documentary evidence collected yielded the following unexpected results of FORECCSA:
 - Initial evidence of reduction in migration patterns especially in provinces in the Jubones River Basin were identified.
 - The beginning of a change in dietary patterns of the general population in beneficiary communities was verified especially consumption of orchard produces.
 - Particularly in El Oro, in communities of mixed-race (mestizo) population, communal collaborative practices were enhanced as well as seed and agricultural products exchange or the participation in *mingas*.
 - The conformation of associations for economic empowerment and participation in matters of productive development especially for women, began.
 - Spaces for collaboration and articulation between local GADs and the community were created to enhance and complement the results of implementing measures.
 - Generation of spillover effects and externalities in the sense of appropriation of neighboring communities of some measures such as aspersión irrigation, family orchards, and organic fertilizer.
 - Acknowledgement of the importance of parish governments as fundamental elements to achieve the Project's objectives and future collaboration with local governments.

6.2 Evaluation of the process

A complex structure that achieves to be locally based: at the beginning of FORECCSA's implementation, the greatest challenges were the lack of clarity in roles, diverse interests, and political agendas of the institutions involved as well as the existing weaknesses in technical-institutional capacity to approach complex matters and the multidimensional nature of food security, climate change, and gender. These inconveniences were significantly reduced thanks to structural adjustments made to the management model adopted in 2015. Effective adjustments that included differentiated roles, furthering direct agreements with local GADs, assigning local promoters, designing and adopting a highly-participative implementation process as well as local pertinence. In addition to adopting a monitoring and evaluation

system that met the follow-up requirements of multiple tasks required by the implementation of measures.

Complementarity of focused and sustainable actions: The diverse nature of the issues, their main activities and the adaptation measures to the effects of climate change, as well as the number of beneficiaries and geographic dispersion, compared to the size of the technical team, made FORECCSA a project with large and complex challenges during its implementation. Despite its great capacity to articulate complex matters into tangible actions, they were not necessarily applied in a sufficient and complementary way in intervened families and parishes that would also have the possibility to be standardized, measurable, and sustainable in relation to the project's main objective.

Importance of support processes and scope of co-execution: The project did not sufficiently seize the fact that due to its nature and scope, simplified procedures were needed with efficient response times to support processes such as purchases. It also failed to value the real importance of the engagement and co-execution required, based on competencies of other institutions such as the MAG, Provincial Governments, Environmental Provincial Departments, SENAGUA, as well as other types of local organizations that did not have an important and sustained role to support implementation and contribute to the sustainability of the implemented initiatives.

6.3 Monitoring and Evaluation System of the Project

System design: It is concluded that the design of the M&E System was adequate for the foreseen outcomes and that its indicators and outputs were relevant and coherent with the Project's objectives. The system was not only aimed at following up indicators of the outcomes of the logical framework but that it also monitored advances in execution of measures of adaptation and complementary incentives, annual operational plans, financial control, food security, and gender focus.

Another favorable aspect of the system's design is that it was directly loaded with information obtained in the field by technicians in charge. During the Project's execution, the system included new tools and variables that made its operation difficult and demanded a lot of work from central and local responsible parties.

6.4 Sustainability and Risks

- Financing Risks: Despite the political importance in Ecuador given to matters of climate change, food security, and gender, the support provided by the central government to local governments due to the current economic and fiscal situation of the country and the dependence of parish boards on transfers received from the central Government, the financing risks is one of the biggest challenges that FORECCSA will face in the future to maintain and replicate its accomplishments.
- Socio-political Risks: Social risks that could affect the permanence of FORECCSA's accomplishments are considered low. This conclusion is supported by the high level of participation, appropriation, and commitment achieved by the Project both by its beneficiaries as well as by institutional stakeholders involved in its design and execution.

- Politically, The team reached the conclusion that development of the Ecuadorian regulatory framework in matters of climate change, food security, and gender focus starting with its political constitution, and including its development plans, laws, and other pertinent regulations, as well as FORECCSA's contributions making regulations extend to parish governments are mandates that compel national and local institutions to appropriate the Project's objectives and maintain them in their processes, programs, and work modalities in the future.
- Normative and institutional framework risks: It is concluded that the management model adopted by FORECCSA; the degree of interinstitutional coordination reached especially with Parish Boards; the Parish Boards enhancement, furthermore vulnerability studies, plans to adapt to climate change. Fully operational adaptation measures and trained human capital as well as the articulation with similar programs or projects in the territories are all accomplishments of the project that within the institutional scope minimize the probability of non-permanence of achievements.
- Risks of communities and beneficiaries: During focus groups, beneficiaries rated two of the project's main objectives as high. 79% consider that the acquisition of knowledge about management of climate change risk was good or very good and 88% consider the preparation of communities to manage climate change risks to be good or very good, especially on food security. This allows to conclude that the risks of sustainability of outcomes reached by the Project being affected are low.

6.5 Managing Gender challenges

- Accomplishments in Women Participation: In relation to the achievement of the project's objectives regarding the participation of women, it is reflected that 53% of women participated in the decision-making process and 57% participated in training processes. Regarding the community that participated in focus groups, they rated the results from women in parishes that had been actively involved in the project as very good (57%), good (36%) and regular (only 7%).
- Qualitative jump in implementation of FORECCSA's measures: Regarding gender challenges, a qualitative jump was made regarding implementation of measures during the project. This was achieved thanks to the awareness raising and assistance provided by UN Women to the technical team, promoting participation and allowing access of women to technology (irrigation, inputs, agricultural management, environmental), especially during the process of implementation of the measures and the complementary incentives.
- Less work time and additional income: One of the project's successful outcomes and contributions was that beneficiaries (especially women), thanks to the measures of adaptation and incentives such as the community and parcel irrigation, achieved a reduction of an average of three hours in their working load. In many cases, by procuring their own production, they saved resources by reducing purchases at markets and obtained marketable surpluses that improved the family budgets. Some beneficiaries who generated marketable surpluses had problems selling them and lost motivation.

PROJECT KNOWLEDGE MANAGEMENT

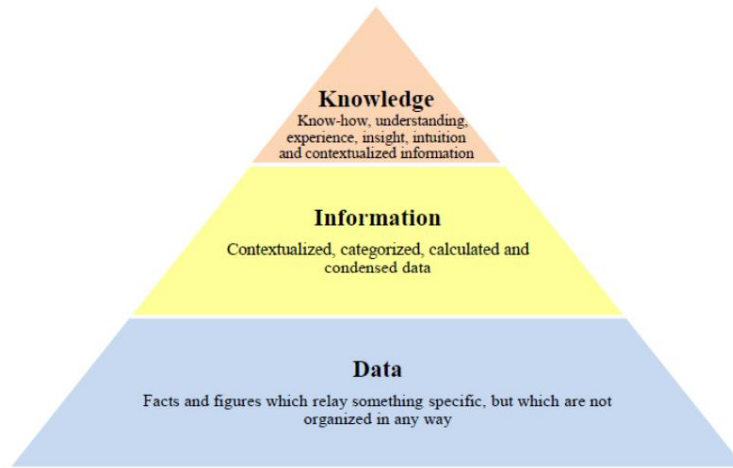
The application of a knowledge management strategy for the results of the FORECCSA project, starts from sharing a common language at the level of an organization or project; The difference between the perception of one person and another around the definition of "knowledge" and "knowledge management", has generated for years the need to conceptualize and operationalize this tool in organizations and international workspaces, such as the System United Nations¹⁷

In this sense, WFP Ecuador is applying a knowledge management strategy for the project based on the strategy developed and systematized by WFP Nigeria, which is based on 3 fundamental pillars:

- a) **Strengthening knowledge internally:** The first dimension relates to internal knowledge management to ensure getting the right knowledge, in the right place, at the right time to improve evidence building, efficiency and effectiveness of WFP policies and programs and strengthen capacity of its staff. This strengthening of knowledge at the project team level and among the main actors such as WFP, MAE, MAG, and GAD, was maintained until the end of the implementation.
- b) **Knowledge sharing and capitalization:** The second dimension is knowledge management with the external actors, namely Government, other agencies, non-governmental organizations (NGOs) and donors with the objectives of capitalizing results obtained by the resilience community, and sharing WFP's experience, lessons learned and good practices and learning from other partners. As part of the process of closure of the FORECCSA project, important systematization material was elaborated that includes lessons learned, good practices, audiovisual products, among others, that summarize the *know - how* of the implementation with a priority focus over information and data (see figure 5), and that are being managed at present by WFP with national and international actors.

¹⁷ Dumitriu, Petru "Knowledge management in the United Nations system" JIU/REP/2016/10 - Joint Inspection Unit, United Nations. Ginebra, 2016.

Figure 5: Data, information, knowledge: conceptual differences



Source: Petru: 8, 2016

- c) **Capacity Development and Transfer:** Lastly, seeking replicable and scalable models which can be transferred to the Government by testing WFP's approach and models, ensuring the strengthening of national systems and capacities in order to develop a progressive exit strategy is the third dimension. Similarly, this implementation model that links the effects of climate change on food and nutrition security of vulnerable populations is currently being replicated by WFP Country Offices of Ecuador and Colombia in the binational project "Building adaptive capacity to climate change through food security and nutrition actions in vulnerable Afro and indigenous communities in the Colombia-Ecuador border area", considering all the lessons learned, good practices and results for sustainability by the FORECCSA project.

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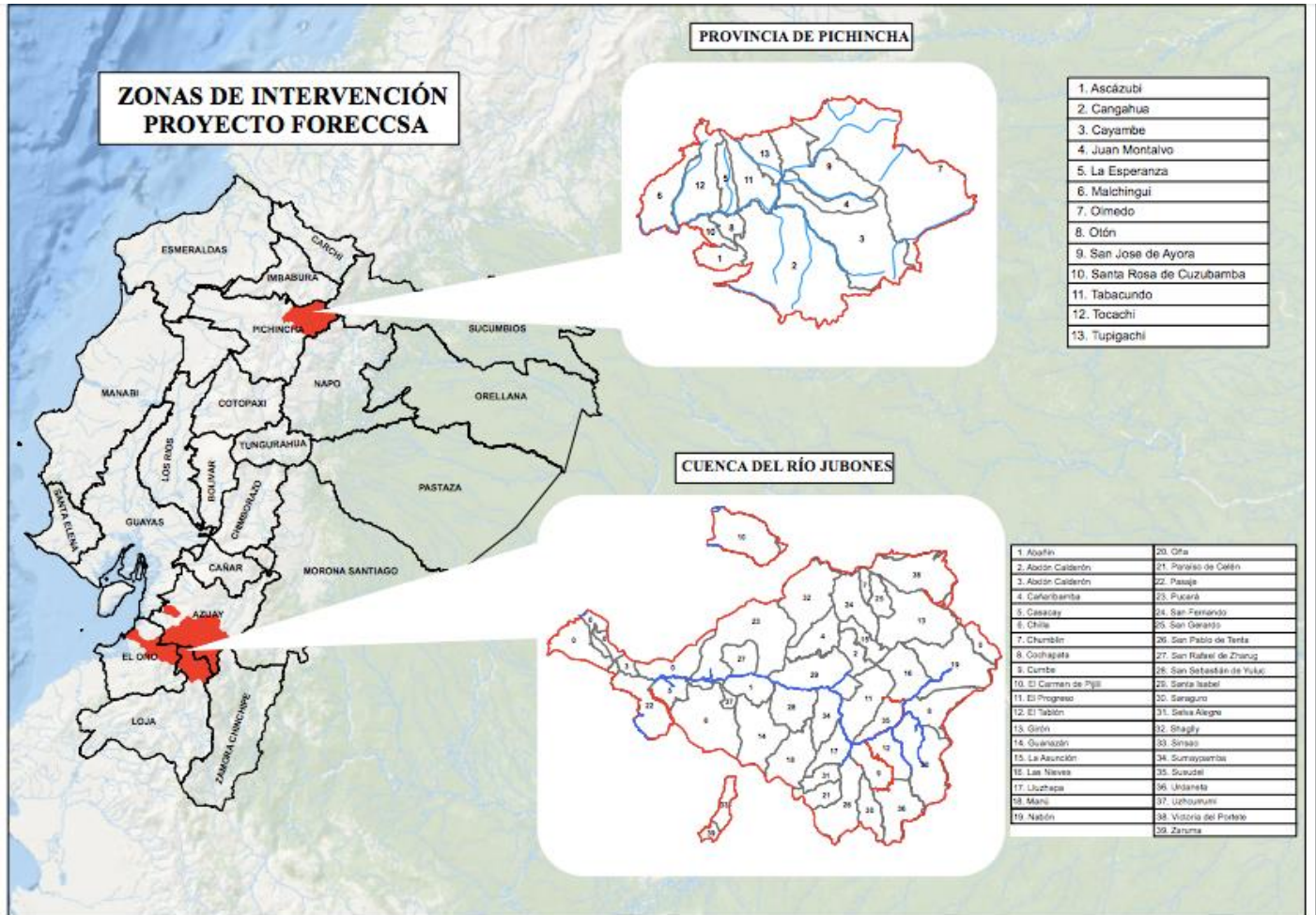


**Gobiernos Autónomos
Descentralizados de
Jubones**



ANNEXES

9.1.ANEX 1: Project Map



9.1 ANNEX 2: COP 24 FORECCSA Project Presentation (see separate file)

9.2 ANNEX 3: Final Systematization Report (see separate file)

9.3 ANNEX 4: FORECCSA Project Policy Brief (see separate file)

9.4 ANNEX 6: Baseline analysis and results after implementation of the types of adaptation measures

To measure the impact of the implementation of adaptation measures in vulnerable communities, impact indicators were formulated in the dimensions of: diversity of diet, family income, time dedicated to crops and local production.¹⁸ These indicators had the purpose of comparing the initial state, without intervention of the project, with a state of resilience, after the implementation.

The sample was calculated under a probabilistic design with the purpose of knowing the proportion of households that present an adequate level in the diversity of the diet (indicator of food consumption) and an effective implementation of the nine types of measures, including 2,010 households in the CRJ and 214 households in Pichincha.

The data collection for both indicators (food consumption and indicators for the types of measures), was carried out in two stages: the initial survey in 2016, when the project had already implemented actions in some parishes and in others it initiated the actions, and the final survey was carried out at the end of 2017 and the beginning of 2018, once the implementation of project activities was concluded. Below are the main results for each type of measure:

Table 4: Results of community irrigation indicators

Aspect	Baseline	Post implementation
Water quality	40% Good 18% bad	59% Good 1% bad
Production in dry season	66% plant	84% plant
	31% don't plant	15% don't plant
Beneficiaries who grow in the dry season	54 potato	55 potato
	48 onion	50 onion
	48 vegetables	83 vegetables
	40 corn	46 corn
Beneficiaries vegetables in the inter-Andean valleys	80 onion	87 onion
	60 pepper	65 pepper
	33 tomato	45 tomato
Beneficiaries fruit inter-Andean valleys	32 avocado	56 avocado
	42 guava	45 guava
	49 orange	56 orange

Source: FORECCSA, baseline results vs post implementation (July 2018)

The improvement in water quality has increased by 19% with reference to the baseline managed by the Project, which has reached 69% of beneficiaries who have good water quality for their crops. Thus,

¹⁸ The classification of types of adaptation measures allowed to generate unified information by types of measures and to report impact data according to the type of measure and the parish, which are reflected in the matrix of hard data. After the results obtained in the midterm evaluation, an adjustment was made to the logical framework to better report the results obtained, so in the PPR of 2016, it began to report under this logic. In addition to this report, the need to enrich the impact of the implementation of adaptation measures in vulnerable communities was determined. In view of this, impact indicators were formulated in the dimensions of diversity, income, time and production, to compare the initial status without intervention of the Project, with a state of resilience, post implementation. FORECCSA M&E.

increases in crops in the dry season have had a significant increase by 18 percentage points. The increase in these crops was identified in vegetables going from 48 beneficiaries in the baseline to 83 beneficiaries who dedicate themselves to this activity after the implementation, without neglecting the other items such as potatoes, onions, corn, pepper, tomato kidney and avocado. Likewise, they have had a remarkable increase. In the case of fruit trees, the avocado and oranges have had an increase of 24 beneficiaries and 7 beneficiaries respectively.

Next, in Table 5, the results of the implementation of the plot irrigation system are presented:

Table 5: Results of plot irrigation systems indicators

Aspect	Baseline	Post implementation
Watering time on plot	21% 1 to 2 hours	32% 1 to 2 hours
Water amount	58% insufficient water	45% insufficient water
	14% enough water	41% enough water

Source: FORECCSA, baseline results vs post-implementation (July 2018)

In relation to irrigation times, at the beginning of the project it was reported that 21% had irrigation between one to two hours, while after the project this percentage was increased to 32% of beneficiaries. The amount of water that people received during their shifts was not enough to endow their crops, reporting 58% of insufficient water; after the intervention of the project, the insufficient irrigation decreased to 45%, increasing the percentage of enough water for the farms from 14% in the baseline to 41% of enough water after the implementation.

Table 6 presents the results of the water source protection indicators:

Table 6: Results of water source protection indicators

Aspect	Baseline	Post implementation
Areas of 4,000 m ² : number of beneficiaries implementing water sources protection practices	23 beneficiaries	31 beneficiaries
Areas of 20,000 m ² : number of beneficiaries implementing water sources protection practices	40 beneficiaries	53 beneficiaries
Water source protection	27 % protected	90 % protected
Type of water source protection	5% physical works	19 % physical works
	7% biological works	7% biological works
	15 % physical and biological works	68% physical and biological works
Fences of the water source	5% fenced	17% fenced
Presence of animals in water sources	86 % Presence of animals in water sources	43% Presence of animals in water sources

Source: FORECCSA, results of baseline vs post-implementation (July 2018)

In the previous table the care of water sources reached a range of 74%. Before the start of the project, they were not careful, but after the implementation of the project 90% protection of water sources is now available, especially in areas of 4,000 m² and 20,000 m² that are areas where the beneficiaries do it individually.

The type of protection of water sources from the beginning of the project was based on physical, biological works and joint works (the two previous ones); after the implementation, the joint works are those that were carried out most throughout the project, going from 15% at the beginning to 68% at the end.

The following is a summary of the indicators of the adaptation measure of water for human consumption:

Table 7: Results of water for human consumption measure indicators

Aspect	Baseline	Post implementation
States of the systems	28.8% no treatment	32.4% no treatment
know the sources where the water comes from	49% yes, they know	88 % yes, they know
	51% they do not know	12 % they do not know
Water quality	2% good quality	64 % good quality
Water service (24 hours a day)	20.3% had water	85.4 % had water
Planting of forest plants in the slopes	3.9 % did the planting	13.9% did the planting
Water saving	12.1% beneficiaries did it	41.6 % beneficiaries did it

Source: FORECCSA, baseline results vs post-implementation (July 2018)

In Table 6, 28.8% of the people did not have water treatment systems, while after the implementation of the Project, this percentage amounted to 32.4%. The beneficiaries, at the beginning of the Project, did not know where the water came from for their consumption, having a percentage of 51% that indicated ignorance of the water sources, while, after implementation, 88% of the beneficiaries said they knew about the water springs that they supply to their homes.

Regarding water quality, at the beginning of the project, the quality provision was barely 2% while, after the actions carried out within the project, this percentage reached 64%. The provision of drinking water service 24 hours a day at the start of the project was 20.3% and after implementation it reached 85.4%. The planting of forest plants in the slopes, at the beginning of the project had a value of 3.9%; after the implementation of the project, this value reached 13.9%. Finally, in what has to do with the saving of water by the beneficiaries, at the beginning of the project only 12.1% saved, while the rest was not careful in the use and waste of water. After the implementation of the project, savings reached a range of 41.6%.

Table 8 shows the results of the small livestock adaptation measure:

Table 8: Results of the small livestock measure

Aspect	Baseline	Post implementation
Biosafety	98% they do not use	30% they do not use
	2% yes they use	70% yes they use
Production destination	86% self consumption	78% self consumption
	3% sale and self consumption	6% sale and self consumption

Source: FORECCSA, baseline results vs post-implementation (July 2018)

Within the indicators of management of small livestock, the beneficiaries reported that only 2% performed biosecurity management; after project interventions and the strengthening of capacities in biosecurity management, an increase of up to 70% of the beneficiaries has been achieved.

The fate of the production obtained for sale and self-consumption doubled from 3% at the beginning of the project to 6% after the intervention, which improved the diet of the beneficiaries and, in addition to this, the surplus was sold in the markets. Table 9 shows the results of the homestead gardens adaptation measure:

Table 9: Results of the orchards indicators

Aspect	Baseline	Post implementation
Orchards with sprinkler irrigation	13.8 % the irrigation system works	37% the irrigation system works
	17 % the system is regular	4.2% the system is regular
Family self - consumption	60.5% of the beneficiary families have an orchard for production of vegetables	97.8% of the beneficiary families have an orchard for production of vegetables

Source: FORECCSA, baseline results vs post-implementation (July 2018)

The allocation of sprinkler irrigation systems for orchards, at the beginning of the project, had a percentage of 13.8% while, at the end of the Project, it had 37% of orchards that consist of this type of irrigation. It should be noted, in addition, that the operations of the systems were much more effective; At the beginning of the project there were regular systems that reached 17%, which suffers a decrease at the end of the Project at 4.2%, since the beneficiaries learned to properly manage the irrigation systems.

Of the crops produced by the beneficiaries of the Project, 60.5% was destined for self-consumption; after the intervention, the production destined to self-consumption was 97.8%, thus improving the family's diet. Table 10 presents the results of the agroforestry systems adaptation measure indicators:

Table 10: Results of the agroforestry systems adaptation measure indicators

Aspect	Baseline	Post implementation
Types of varieties of pastures planted	Does not plant grasslands	Disappears (distributed in the other categories)
	18% sow a variety	6% sow a variety
	49% sow two to three varieties	57% sow two to three varieties
	6% sow more than three varieties	37% sow more than three varieties
Management of organic fertilizers	5% manage	57% manage
	95 % do not manage	43% do not manage
Responsibility in the management of pastures	30% Man	25% Man
	49% Woman	44% Woman
	21% Both of them	31% Both of them
Amount of pasture enough for livestock feed	9% yes its enough	48% yes its enough
	91% no it's not enough	52% no it's not enough
Main way to supply the shortage of pastures	27% transfer of animals to other pastures	59% transfer of animals to other pastures
	64% they rent paddocks	39% they rent paddocks
	2% they use balanced meal	1% they use balanced meal

They know pasture improvement techniques	6% yes they know	93% yes they know
	94% no, they do not know	7% no, they do not know
Current production of forage per surface	7,397.13 kg/ha	16,341.4 kg/ha

Source: FORECCSA, baseline results vs post-implementation (July 2018)

In the previous table, referring to the implementation of silvopastures, it can be clearly seen that at the start of the project there were beneficiaries who did not plant grasslands due to lack of irrigation; while after the implementation, all the beneficiaries have established pastures in different forms of association. The one that stands out is that of 57% of the beneficiaries who sow two to three varieties.

Regarding pasture management techniques at the beginning of the project, 94% of the beneficiaries did not know about the subject; after the implementation, the knowledge about pasture management techniques increased to 93%, which has generated an increase of 16,341.4 kg / ha at the end of the project.

Regarding livestock feeding, at the beginning only 9% of the beneficiaries said that it was enough; after the implementation of the project, this percentage increased to 48%. The rotation of paddocks increased with the establishment of new pastures. This is how, at the beginning of the project, 27% of respondents moved their animals to other pastures, which, at the end of the implementation, increased to 59%, while the acquisition of balanced products decreased from 2% at the beginning of the project to 1% after the completion.

Regarding the management of organic fertilizers, at the beginning of the project, 95% did not carry out any activity related to the topic, while after the completion of the project, 57% of beneficiaries perform some type of organic management. Responsibility for grassland management at the beginning was borne by women in 49% of the cases at the start of the project, while at the end of the project, the woman is still responsible for the care, but in a minority percentage of 44%.

In the province of Pichincha, the project implementation was directly under the GAD PP, entity that assumed the responsibilities as of August 15, 2014. The implementation model was based, in turn, on the powers granted by Article 133 of the Organic Code Territorial, Autonomy and Decentralization "COOTAD" where it is mentioned: "The constitutional competence to plan, build, operate and maintain irrigation systems is constitutionally assigned to decentralized provincial autonomous governments".

GAD Pichincha assigned the Provincial Risk Management Department (DGRP) and the Environmental Management Department (DGA), with its technical team, to carry out on-site visits and contact with the community leaders, parish authorities and presidents of the irrigators organizations in order to create spaces for dialogues where amounts and times of execution of works were established, to carry out the interventions of the FORECCSA Project. In addition, it should be noted that after the on-site visits, the DGRP issued a favorable social feasibility report for the project implementation.

GAD PP with agreements and support from the municipal GADs of Pedro Moncayo and Cayambe, as well as the parochial GADs, designed the measures to be implemented, which were submitted to the National Executive Committee of the FORECSA Project for approval.

In Pichincha, the figure of community co-management has been managed, thus generating a commitment from the beneficiaries of the communities or water boards. The contribution of the beneficiaries was with labor, through the so-called "community mingas" which represents, on average, a range between 40% and 50% of the total cost of the adaptation measure. The GAD PP contributed with its technical contingent of the different departments and, in turn, with the machinery available for these construction works.

In May 2014, the first measure for the La Esperanza parish was presented and the last measure presented was that of Tocachi in August 2017. In Pichincha, 13 adaptation measures to the Climate Change have been implemented, established in all the parishes of the Cayambe cantons and Pedro Moncayo, within the type of community irrigation measure. For the sustainability of the measures, it has been possible to insert in the PDOTs¹⁹ of the two parishes, in the section of productive economic activities, the care of irrigation systems, which will give greater dynamism to agricultural activity, guaranteeing sovereignty food of the cantons.

Table 11 shows the different incentives delivered in Pichincha during the months of January to March 2018, in the different communities:

Table 11: Amount of incentives delivered in Pichincha

Incentives	Beneficiary Families	Parishes
Silos for seeds	348	Cangahua, Otón, Tupigachi y Cotacachi
Vegetable kits (cabbage, cauliflower, radish, carrot, beet, spinach, broccoli)	862	Ayora, Olmedo, Otón, Cayambe, Cangahua, Ascázubi, Cuzubamba, Tupigachi, Tocachi, Malchingui
Irrigation Kits	479	Ayora, Olmedo, Otón, Cayambe, Tupigachi, Tocachi, Malchingui.
Soil Studies	208	Ascázubi, Juan Montalvo
Community nurseries	208	Tabacundo.

Source: FORECCSA, Matrix of hard data (2018)

In addition, 1,122 beneficiaries of the project have been trained in climate change, food security and gender in the Pichincha province. It should be noted that, in Pichincha, the Juan Montalvo parish and the cantonal capital of Cayambe were added at the request of the GAPP. In these two sites, an adaptation measure was implemented, taking as reference the information from the vulnerability studies carried out for the 11 parishes of Pichincha; therefore, these sites do not have a vulnerability study or adaptation plan.

¹⁹ *Development and Territorial Ordering Plans* (PDOT by its initials in Spanish). They are instruments that, on the one hand, organize the exercise of competencies of the Decentralized Autonomous Governments, assigned by the Constitution and laws, as well as those that are transferred to them as result of the decentralization process; and, on the other hand, they order the territory in order to define the location of public actions in function of territorial qualities and demands. The plan of development and territorial ordering must articulate the development policies and land-use planning guidelines, in the framework of the National Development Plan and define the responsibilities of public actors (decentralized entities of the Executive Function), private and social in the implementation processes. National Planning Secretariat, 2010.