DATE OF RECEIPT:
ADAPTATION FUND PROJECT ID:
(For Adaptation Fund Board Secretariat Use Only)

PROJECT PROPOSAL

Climate Change Adaptation Proposal to Adaptation Fund

PART I: PROGRAMME INFORMATION

PROGRAMME: **Regular**

COUNTRY: **Ecuador**

TITLE OF PROJECT: **Enhancing resilience of communities to the adverse effects of climate change on food security, in Pichincha Province and the Jubones River basin.**

TYPE OF IMPLEMENTING AGENCY: **Multilateral Implementing Agency**

IMPLEMENTING ENTITY: **World Food Programme**

EXECUTING ENTITIES: **Ministry of Environment in coordination with Ministry of Agriculture, Livestock, Aquaculture and Fisheries, Commonwealth of the River Jubones Basin and Provincial Government of Pichincha**

AMOUNT OF FINANCING REQUESTED: **US$ 7,449,468.**

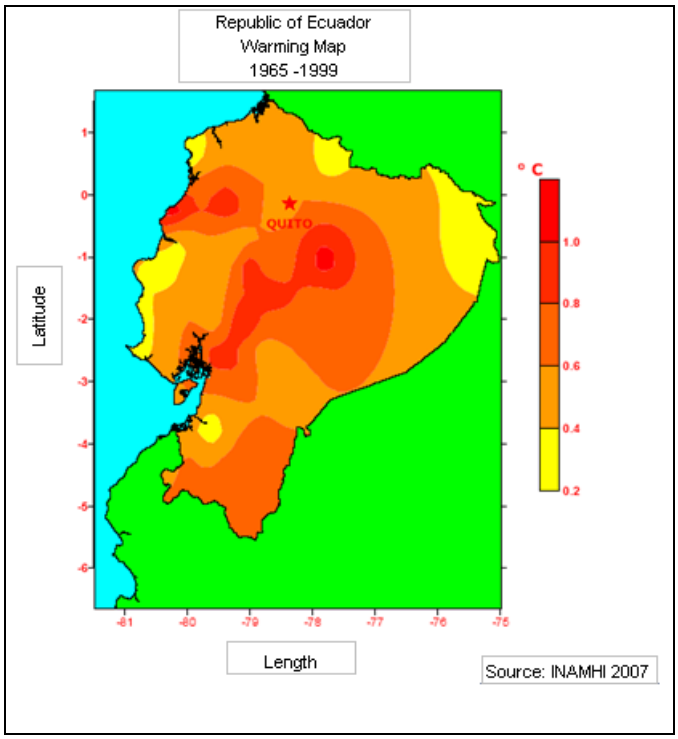
PROJECT BACKGROUND AND CONTEXT

Introduction

Ecuador is highly vulnerable to the impacts of climate change, due to its geographical location and rugged topography (UNFCCC First National Communication, Quito, 2000). Located on the equator with the Andes dividing the country, Ecuador has a land area of 256,370 square kilometers, divided into four regions: the Highlands - with 72 volcanoes, the Pacific coast, the Amazon and the Galapagos Islands Archipelago.

These regions display an extraordinary array of geographical extremes, from high altitude glaciers, to tropical rain forests in the Amazon region, to dry tropical forests on the Pacific Coast, to the Galapagos Islands, a mega-biodiversity World Heritage Site. Some of these systems show a greater sensitivity to climate change, or at least are considered more likely to undergo rapid changes as a result of climate change, including variability. (See Map 1.) The natural fragility of these ecosystems, with vast biodiversity, makes them highly susceptible to small changes in temperature and water availability. In the river basins of Ecuador, environmental degradation also compounds the affects of climate variability, in particular the over-exploitation of forests, crops planted on lands with high erosion rates and over grazing in high altitude areas.[1]

MAP 1
Warming in Ecuador



Studies on the impact of climate change in Ecuador show threats related to the increase in average temperature (1C° increase), the retreat of glaciers (30 percent loss of mass in the last

[1] See Annex IV: Multi-threats Map, source ECHO.

30 years), moorland degeneration and desertification, forest loss, and an increase in the frequency of extreme events. [2]

Direct impacts on local communities include a reduction in water flows, decreased crop yields and increased fragility of ecosystems, resulting in a reduction in ecosystem service provision. Rapid demographic growth and increased population density leave more people exposed to the above mentioned threats and dangers. As well poverty forces people to occupy unsafe land; the poor use the cheapest and disaster prone plots and are hit hardest by disasters. Lack of strategy and capacity to minimize the impact of intense events has resulted in increased exposure and greater economic losses from more frequent events.

A major contributing factor to community vulnerability to climate threats is the lack of awareness of these threats and of mitigation measures; houses built on fragile land; inadequate quality of infrastructure and construction materials; and ongoing environmental damage. Lack of regional policies for the preservation and conservation of natural resources, absence of planning and adequate building codes and standards, and poor application of early warning models compound the negative impacts of recurring events. Specifically, community early warning systems have not been developed. There have been few advances in terms of exploiting existing social organizations and local knowledge to identify climate related threats or solutions. In sum there is little understanding of climate change threats or adaptation measures at community level.

Increasingly Ecuador suffers from a range of natural disasters, including floods, droughts, earthquakes and volcanic eruptions. (Refer to Table 1.) Reoccurring floods and droughts are also intensifying in severity. In the past decade Ecuador has incurred economic losses of more than $4 billion from droughts alone.[3] This high exposure has increased the vulnerability of key economic sectors such as agriculture, water resources, fisheries, infrastructure and tourism. Annual economic losses to these sectors highlights that Ecuador is a country particularly vulnerable to climate change. The effects of climate change, including the increased frequency and intensity of El Niño and La Niña, combined with deep pockets of food insecurity and poverty requires Ecuador to develop sound planning and replicable implementation models to address climate change threats.

Although Ecuador is oil exporter country, large disparities in living conditions and access to opportunities exist. Inequality and exclusion are related to ethnicity, place of residence (urban and rural), gender and age. Ecuador is ranked 80th out of 182 countries in the 2009 UNDP Human Development report. Chronic malnutrition affects 26 percent of children under five at the national level; however the rate reaches almost 45 percent in the highlands of Ecuador and 47 percent for indigenous populations (SIISE-MCDS 2006, WHO, 2005). Lack of access to food and consumption factors such as poor nutrition practices and health problems contribute to high malnutrition rates. The incidence of extreme poverty at national level is 13 percent, but is higher in rural areas, exceeding 49 percent. As highlighted in the Millennium Ecosystem Report, 21 percent of the land area in Ecuador is used for agriculture. According to the Survey of Living Conditions (SLC 2006), over 51 percent of heads of household who live in poverty with limited

[2] Vulnerability - Adaptation and Mitigation to Climate Change in Ecuador: compendium of actions, strategies and profiles of projects in the energy sectors, forestry, agriculture, coastal marine and water resources. National Committee for Climate, Ministry of Environment, Ecuador, June 2001.
Evidence of Climate Change in Ecuador – update. National Committee for Climate, - Ministry of the Environment (Project ECU/99/g31 Climate Change, Phase II, Ecuador, June 2002).
National Communication Republic of Ecuador for UNFCCC, Ministry of Environment, Ecuador, November 2000.
Notes for the discussion of the national human development strategy: contributions to an alternative environmental strategy, sustainability indicators and environmental policies. SENPLADES, FLACSO Ecuador, UNDP Ecuador, CISMIL2015, 2009.
[3] See Annex V: VAM Ecuador: food insecurity, erosion, frost and desertification maps, WFP Ecuador, 2010.

purchasing power, earn their living through agricultural, livestock or fishing activities and are dependent on stable water supplies.

Food insecurity is high in the country's disaster prone areas, mainly in the rural sector populated by indigenous and Afro-Ecuadorian populations. These groups are adversely affected by ongoing floods, volcanic eruptions and droughts, and are least able to cope with individual events or changing climatic patterns.

TABLE 1

Numbers of affected population and estimated economic cost of disasters in selected South American countries 2000 – 2010

	Drought		Earthquakes/ Volcanic Eruptions		Floods / Rains		TOTAL	TOTAL US$'000
Countries	Affected	Economic Cost	Affected	Economic Cost	Affected	Economic Cost	**Total Affected**	**Economic Cost**
Argentina		120,000	727,000		729,713	2,133,210	**730,440**	**2,253,210**
Bolivia	102,500				1,459,770	847,000	**1,562,270**	**847,000**
Brazil	2,000,000	1,650,000	286,000		4,506,375	2,444,840	**6,506,661**	**4,094,840**
Colombia			149,248	10,000	4,540,868	10,000	**4,690,116**	**20,000**
Ecuador	107,500	4,000,000	497,683	160,975	430,699	1,018,800	**1,035,882**	**5,179,775**
Paraguay	310,990				75,655	820,000	**386,645**	**820,000**
Peru	21,500		1,017,934	900,050	749,923		**1,789,357**	**900,050**
Uruguay		250,000			156,312	70,000	**156,312**	**320,000**
Venezuela					136,192	54,000	**136,192**	**54,000**

Source: "EM-DAT: The OFDA/CRED International Disaster Database. Created on: Mar-18-2010. - Data version: v12.07 www.emdat.be - Université Catholique de Louvain - Brussels - Belgium"

The Proposed Project

The Government of Ecuador, as well as provincial governments recognize that it is essential to take action to: 1) increase awareness of climate change threats; 2) generate more information and knowledge so that local communities can adapt to climate change threats; 3) create local plans that identify community priorities which support the implementation of adaptation measures to increase capacity to mitigate the impact of these threats; and 4) ensure that the poorest communities have the capacity to adapt to climate change impacts without further eroding their nutrition and food security.

The proposed project supports these strategic directions, is in line with the new Constitution of Ecuador, and is in conformity with the National Development Plan 2009-2013 which is the basis for the UNDAF 2010 - 2014. In particular the project supports Ecuador's efforts to reach MDG 1: to reduce under nutrition and hunger in half by the year 2015; and MDG 7: to ensure environment sustainability.

The proposed project strongly supports the policies and strategies of the 4 targeted provinces: Pichincha, Azuay, Loja and El Oro. The proposed project contains two important watersheds and covers 12 cantons, approximately 120 communities and 15,000 families. The Pichincha Provincial Government (GPP) and the Commonwealth of the River Jubones basin (MCRJ) have identified as priority, the implementation of adaptation measures, in order to support local communities to respond to climate change threats, to reduce their vulnerability to climate change and build ecosystem resilience, in particular of moorlands and forests. MCRJ is an

organization comprised of 15 decentralized autonomous governments (GAD) and 12 cantons in 3 provinces (Azuay, Loja and El Oro). MCJR aims to ensure a coordinated effort, including the participation of the local actors, for the management of natural resources in the River Jubones watershed.

The project is in line with WFP's overall strategy in Ecuador; one of supporting government priorities through a focused effort to: 1) improve food and nutrition security in integrated cross-sectoral strategies; 2) support preparedness and mitigation of risks caused by natural disasters and climate variability; and 3) assist Colombian refugees and host populations directly affected by the conflict in the Northern part of Ecuador, in support of Plan Ecuador. These areas, in addition to emergency response comprise WFP's strategy in Ecuador. As well, the proposed project supports WFP's global mandate and the following strategic objectives: S02 which prevents acute hunger through investments in disaster preparation and risk reduction; and SO5 which builds capacities to reduce hunger through support for government implementation of hunger related solutions.

Country Eligibility

Ecuador ratified the UNFCCC through a Congressional Resolution dated January 6th 1993, which was published as Executive Decree No. 565 in the Official Journal No. 148, March 16th 1993. The Kyoto Protocol was also signed and ratified by Ecuador in December 1999 (Official Journal No. 342, December 20th, 1999). The technical focal point for the UNFCCC and the Kyoto Protocol is the Under-Secretary of Environmental Quality at the Ministry of Environment (MAE) of the Republic of Ecuador, currently Climate Change Under-Secretary of MAE.

Climate Policy in Ecuador

Policy Context

Climate Policy in Ecuador dates back to the early 1990s, when it became clear that the country was particularly vulnerable to the effects of climate change. Following the UNFCCC ratification in 1993, the Meteorological and Hydrological Institute (INAMHI) led the Climate Change Process in Ecuador Project (PCCE). This initiative brought, for the first time, the issue of climate change to the attention of public policy makers in Ecuador. This initiative generated a number of other actions including:

- The Ecuador Climate Change Country Study (EPA);
- A Dutch funded project on the impact of Climate Change on the coastal region;
- A Climate Change Training Program - Ecuador (CC Train);
- UNEP's Program for Offsetting of GHG emissions in Ecuador (UNEP-RISO);
- UNDP-GEF technical support for Stages I and II of Ecuador's National Communication to the UNFCCC.

The First National Communication (FCN) provides an overview of Ecuador's climate change policy (2001). The Second National Communications provides important data on the sectors that emit green house gases (GHG) in Ecuador, especially actions related to deforestation, land use change, mitigation actions and energy use.

The FCN produced the first benchmark on GHG emissions and emphasized adaptation to climate change as a national priority. It identifies priority systems in terms of their sensitivity to climate change and defines a series of policy options to improve Ecuador's management of climate risks, highlighting water governance as a national priority. According to the FCN, Ecuador contributes 0.001% of global greenhouse gas emissions.

Climate warming affects temperature and rainfall patterns and has a direct impact on local communities, affecting economic production and increasing the fragility of ecosystems. The Second National Communication states that the threats to ecosystems will have long ranging affects. In the area of the project, due to the increase of average temperature and the severity of rainfalls, a retreat of Cayambe glacier is clear. The degradation of the watersheds, lack of sustainable management of moorlands and water resources and the patterns of agricultural exploitation has contributed to the progressive degradation or transformation of the ecosystems. Many villages may face water scarcity in the future. According to the Second National Communication "All patterns indicate an unequivocal warming of the climate system in all the regions of the country. The foreseen climate change is consistent with world-wide patterns, although Harrison & Carson (2007) foresee areas of cold weather in South American Pacific Coast".

In spite of the low contribution to global emissions, the commitment of the Government of Ecuador to climate change is evident. The 414th article of the Constitution of Ecuador establishes that the "State shall take appropriate and transversal measures for the mitigation of climate change through the limitation of emissions of greenhouse, deforestation and air pollution; shall take measures for the conservation of forests and vegetation, and will protect the population at risk".

Ecuador has recognized adaptation and mitigation to climate change in national policy. (See Annex I, Executive Decree 1815, July 1, 2009) The fourth article of the Executive Decree 1815 grants all the powers, functions and performances previously assumed by the National Climate Committee, to the National Division of Climate Change, Production and Sustainable Consumption under the Ministry of Environment. The post of Under-Secretary of Climate Change in MAE was created in December 2009. This Under-Secretary is responsible for the management of climate change in coordination with other State entities and civil society.

Adaptation and mitigation to climate change are well defined as priorities in the National Environmental Policy (Policy 3, MAE 2010). The policy outlines the management for the adaptation of ecosystems and populations to climate change, and prioritizes plans, measures and actions to:

- Mitigate the impacts of climate change and other natural events on populations and ecosystems.
- Manage the inherent risk associated with extreme events linked to climate change, and
- Reduce emissions of GHGs in the productive and social sectors.

With Executive Decree 1815 (mentioned above), MAE has assumed responsibility for formulating and implementing the National Strategy on Climate Change. It includes initiatives for awareness raising, measures for adaptation, mitigation and climate risk management, and threat and risk information generation. In addition, the strategy promotes inter-institutional coordination of climate change initiatives at all levels of the State. The National Climate Change Strategy identifies the following priorities:

- Strengthening national scientific capacity for research on the climate system, GHG emissions and the vulnerability of the country to climate change;
- Monitoring climate variability, temperature and precipitation and analyzing vulnerabilities to climate change and GHG emissions;
- Mitigation of GHG emissions and Adaptation to climate change; and
- Building institutional capacities and generating awareness of climate change.

As well, the fourth objective of the National Development Plan (NDP) is to: "Ensure the rights of nature and promote a healthy and sustainable environment". The plan identifies "promoting the adaptation and mitigation to climate change with emphasis on the process of climate change adaptation" as apriority (SENPLADES 2009). This policy promotes the implementation of adaptation programs, with particular attention to vulnerable and fragile ecosystems, food sovereignty, and inter-institutional coordination among different key partners.

Given the high priority of sustainably managing water resources, the National Secretariat of Water (SENAGUA) was created through Executive Decree No. 1088, promulgated on May 15, 2008. It is responsible for managing water in a sustainable and integrated way through watershed management strategies. One of its main objectives is to promote policies for the protection of watersheds with emphasis on the conservation of native forests and preservation of water quality at the source.

Implementation Context

Directly linked to the National strategy, MAE is implementing two adaptation projects funded by the Global Environment Facility (GEF). The first project is Ada*ptation to Climate Change through Effective Water Governance in Ecuador* (PACC). Its main objective is to reduce Ecuador's vulnerability to climate change through increased adaptive capacities. It promotes efficient water management and improved access to timely and accurate climate data. This project focuses on mainstreaming adaptation to climate change in water management in Ecuador and includes three basins (Azuay, Loja, Los Ríos). The other project is, *Reduce the Impact of Rapid Glaciers Retreat in the Tropical Andes of Peru, Bolivia and Ecuador countries* (PRAA). The main objective is to contribute to strengthen the resilience of local ecosystems and economies to the impacts of glacier retreat in the Tropical Andes. In the case of Ecuador, the PRAA mainly emphasizes sustainable management and conservation of micro-watersheds and moorlands surrounding the Antisana volcano.

In support of the national policy framework, Ecuador is implementing several strategic measures to reduce GHG emissions, including with Partner Forest and Partner Moorland. These initiatives

provide economic incentives for the conservation of forests and moorlands in support of ecosystem management and the reduction of deforestation. The aim is to reduce GHG emissions and support adaptation measures which build ecosystem resilience through the conservation of biodiversity, provision of environmental services and the improvement of social conditions. These initiatives have contributed to the conservation of 260,000 hectares of forests. Since 2001,CAMAREN (Consorcio de Capacitación en el Manejo de los Recursos Naturales Renovables), a consortium comprised of state agencies (MAE, CREA) and of representatives from a dozen national universities and NGOs, brought together a series of stakeholders interested in water governance in Ecuador. This forum offers a unique framework through which to mainstream climate change concerns into the emerging agenda Water in Ecuador. The Sixth Forum on Water Resources was carried out in June 2010.

The Ministry of Energy is also promoting initiatives for the promotion of energy efficiency. Ecuador also implements projects with the Clean Development Mechanism (CDM), (a total of 25 projects registered and/or validated in areas such as hydropower and energy efficiency. In addition, MAE is also sponsoring an awareness campaign on the importance of energy efficiency in the fight against climate change.

Climate Vulnerability at National Level

The final report of the Intergovernmental Panel on Climate Change (IPCC), confirmed that the warming of the climate system is unequivocal. With regard to water, the report notes, among other impacts, an acceleration in the reduction of glacial mass and snow cover. The immediate affects are a reduction in water availability for human consumption, a decrease in hydroelectric potential, and a disruption in seasonal water flows. Among the most affected areas are the Hindu-Kush, Himalayas, and the Andes.

In Latin America, the report cited that: a) tropical forests in the Amazon would be gradually replaced by savannas; b) semi-arid, vegetation would be replaced by arid land vegetation; c) there would be a loss of biodiversity, with extinctions of species; and d) reductions in agricultural and livestock productivity would occur with adverse consequences for food and nutrition security. With respect to water, changes in precipitation patterns and the disappearance of glaciers would significantly affect the availability of water for hydroelectric, agricultural, and human consumption.

According to the Ecuador National Environment Policy (MAE,2010), the country has experienced sustained increases in temperature, changes in frequency and intensity of extreme events (droughts, floods), changes in the hydrological regime, and the retreat of glaciers. Crucial is the variation recorded in the last ten years with intense precipitation in very short periods followed by periods of significant decrease in precipitation. As well, the retreat of glaciers in recent years is significant, 20 to 30 percent loss of ice mass in the last 30 years.

For example, recent studies show that the surface covered by glacial ice on the mountain Cotopaxi has decreased by 30 percent since 1976 (Cáceres, B. *et al* 2005). High mountain agro-ecosystems in Ecuador are exposed to cyclical drought, thus glacier runoff is critical for providing mountain communities with reliable water sources and sustaining livelihoods. Likewise, coastal and estuarine ecosystems along the Pacific Coast and the Guayas River estuary are particularly exposed to rising sea levels and settlements in the low-lying coastal areas. These zones are affected by increased coastal erosion, tidal surges and flooding. They

are particularly prone to salt water intrusion, and aquifers are especially vulnerable to changes in groundwater quality.

There is currently no updated assessment of the state of water resources in Ecuador. The last available study dates back to 1989, and was commissioned by the former Instituto Ecuatoriano de Recursos Hidráulicos (INERHI) and the Centro de Estudios y Experimentación de Obras Públicas de España (CEDEX). This assessment serves as a basis for the formulation of the National Plan for Water Resources (PNRHE), which inventoried surface water and compared supply and demand for consumptive and non consumptive uses of water. Few studies exist regarding the state of groundwater supplies in Ecuador. However at this time, SENAGUA is carrying out a study to analyze the water supply and its balance.

The total surface water availability in Ecuador amounts to 146,798 hm3/year, of which 90 percent is found in the Eastern Lowlands which are part of the Upper Amazon Basin. As these figures have not been updated, and projections of supply have not factored-in the impact of climate variability and climate change on water supplies in Ecuador. This reinforces the importance of addressing the lack of reliable climate data and integrating adaptation measures with livelihood strategies at community level in this project.

Over the past few years, increasing social conflicts surrounding water resources and watershed management in Ecuador have led to a growing public debate surrounding the need for policy reform in the water resources sector. The current baseline in Ecuador is characterized by:

- A dispersed water governance arrangement is currently in place, which leads to increased competition and conflict over scarce resources;

- Lack of coherence between national climate information and local/regional end users, as most water use permits are given regardless of the state of water resources;

- Lack of resources (both financial and technical) for community-based users to improve their adaptive capacities or implement innovative water management approaches; and

- Insufficient knowledge generation and dissemination of climate related risks or threats.

Hunting, deforestation, water harvesting activities, mining at small and medium scale, all have contributed to the degradation of ecosystems and the reduction of the species in Ecuador. The excessive use of chemicals in agricultural activities and mining operations, and land use changes all have affected the quality of water in the proposed project area. Agriculture is the main economic activity in the Jubones River Basin. In the middle and high areas agriculture activities are directed to daily subsistence. More than 50 percent of the farming households in the basin are small, particularly in the upper part of the basin with high exposure to droughts (provinces of Azuay and Loja). In the districts of the lower part of the basin (provincial de El Oro), there are less farming units due to high exposure to floods. In the Jubones River Basin, the increase in temperature has caused severe droughts, particularly in the upper zones, affecting the hydrographical basins.

The districts of Pedro Moncayo and Cayambe in the province of Pichincha have the highest rates of malnutrition and basic needs not met and are the districts more vulnerable to climate change. The average temperature in Cayambe is 12ªC and relative humidity of nearly 80 percent. Community livelihoods are based on agro-forestry and floriculture activities for about

50 percent of the population. In district Pedro Moncayo there is a shortage of irrigation water; over-exploitation of soils and excessive use of chemicals. Due to the erosion and severity of rainfall, there has been an increase of landslides. (See Annex XI for more details on climate change scenarios.)

Climate Vulnerability in the Project Area

Two watersheds covering the four provinces have been selected for the proposed climate change adaptation project. They are characterized by different ecological systems, cultural traditions, ethnic composition, and differing reliance's on natural resources to sustain livelihoods. The targeted areas predominately experience high to very high level of food insecurity. As well, in both watersheds communities are affected by climate threats, reoccurring natural disasters and lack of preparedness at local level to deal with climate threats. In the highlands, populations are characterized by ethnic groups of the Quichua nationality. Specifically the population group is Cayambis in Pichincha, Salasacas in Loja and Cañaris in Azuay.

Several studies have been carried out by MCRJ to observe climate threats in the River Jubones watershed. The main finding is that extreme climate change events are affecting the natural water systems of the watershed. In the central zone, long periods of drought occur, lasting up to 16.8 months. In the higher elevations studies show an increase in the frequency of landslides and heavy flooding. A priority for the provincial governments of the MCRJ is to conserve and promote the recovery of natural resources, with the participation of local communities and local organizations. (See Annex II Main risks in the basin of the river Jubones.)

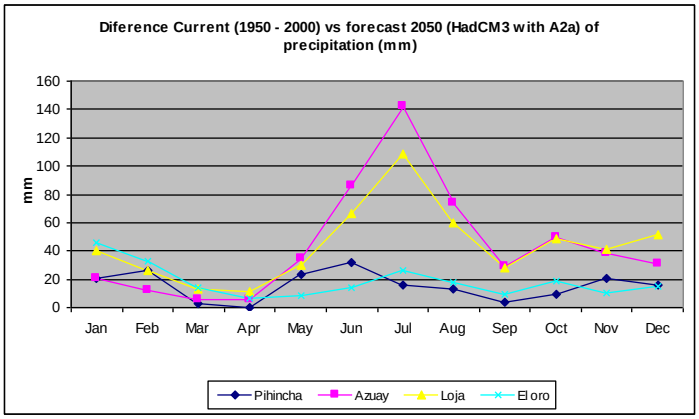
Forecasts made up to the year 2050 (A2a HadCM3 Climate World), which are based on statistics recorded between 1950 and 2000, show significant changes in precipitation in the four project provinces (Pichincha, Azuay, Loja and El Oro). The variation highs are observed in July and in June. In the case of El Oro province, these variations are more significant in the month of December. In addition, variations in temperature exceeded 2 C° (see Graphs 1 and 2, and Annex III Forecast 2050: Precipitation and Temperature). These changes have a direct impact on food security.

The Second National Communication identifies three climate change scenarios at national level for Ecuador. These scenarios resulted from the application of PRECIS, TL959 and ETA patterns and were validated in October 2010. The analysis concludes that an increase in rainfall in the Highlands is foreseen; while a decrease of rainfalls is foreseen in the Pacific Coast and the Amazon. A decrease of rainfall is expected for the lower part of the Jubones River Basin. A systematic climate warming is expected for all the regions in the country.

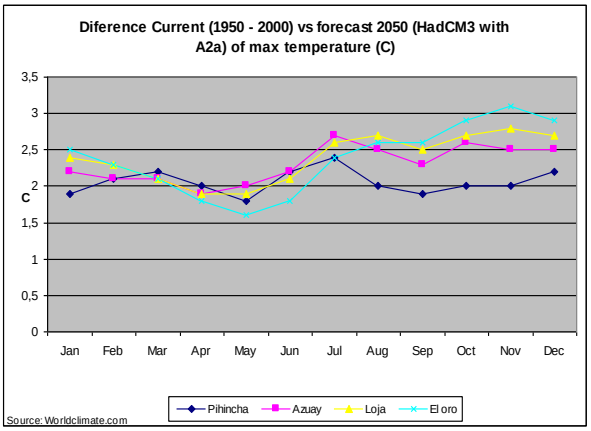
According to the historic climate indexes and applying FCLINDEX, the increase of consecutive non-rainy days is clear. The number of consecutive non-rainy days in 1971 was 3-6 days and the number increased to 15-18 in 1981 in the areas of the project. The change of temperature directly affects rainfall patterns. If the temperature for the period 1991 – 2010 is compared with the scenario for 2010 – 2020 (using the PRECIS pattern), an increase in the average temperature of approximately 0.9 and 1º C is foreseen for the areas of the project. Furthermore, a ten percent decrease of the rainfalls is foreseen, mainly for the lower region of Jubones River Basin while there is a ten percent increase in rainfall in the districts of Cayambe

and Pedro Moncayo in the Province of Pichincha, during the period (See Attachment 1, Analysis of Climate Change Scenarios.)

GRAPH 1
Projected Differences in Precipitation in Targeted Provinces



GRAPH 2
Projected Changes in Temperature in Targeted Provinces



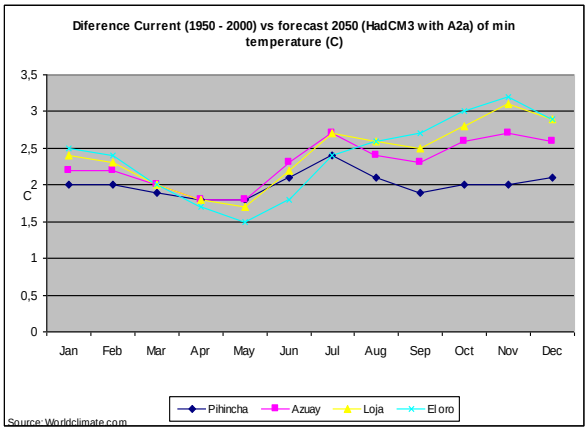


Table 2 shows the level of food insecurity and climate risk in the targeted areas of the project by province and canton. Each province and most cantons face a very high level of undernutrition and food vulnerability. As well, all targeted areas experience reoccurring severe droughts. In Cayambe, glacial melt is a climate change risk that impacts water flows, food production, food availability, and thus the food and nutrition security of communities and families.

In the highland regions, the number of edible plants is affected by drought. As these plants have a long growing period, with one harvest per year, a drought results in no harvest for the year. Further, the reduction of water in the high altitude zones is affecting food production, and in some areas (in Cayambe, Saraguro, Pucará) edible plant varieties are no longer viable in their traditional ecological zones. The result is a high incidence of consumption poverty and food security vulnerability. Nutritional status is also affected as are traditional dietary practices and food habits. Dietary preferences are naturally being modified to fit with coping or mitigation

strategies. From a nutritional point of view, these strategies are inadequate and mothers and children are most affected by the changes in diets related to climate risks.

TABLE 2
Food Security and Climate Risks

Province	Canton	Range of malnutrition	Consumption Poverty	Climate & Food Vulnerability	Climate Risk
Total País		**25,80**	**38,2**		
Pichincha			22,40		Increased in number and severity of droughts
	Cayambe	22,3 - 29,1	23,00	High	
	Pedro Moncayo	29,1 - 35,9	26,00	High	Ice reduction (Cayambe).
Azuay			26,70		Sustained water shortages and droughts that can last up to 16.78 months
	Nabon	63,3 - 70,8	32,00	High	
	Oña	48,3 - 55,8	0,27	High	
	Santa Isabel	40,8 - 48,3	16,00	Very high	
	Pucara	55,8 - 63,3	29,00	High	
	Giron	40,8 - 48,3	12,00	High	
	San Fernando	40,8 - 48,3	16,00	High	
Loja			47,10	High	Extreme events including flooding droughts and. landslides.
	Saraguro	61,6 - 73,3	42,00		
El Oro			28,00		In the lower river basin sustained and recurring flooding.
	Zaruma	23,3 - 34,1	13,00	Moderate to high	
	Chilla	12,6 - 23,3	16,00		
	Pasaje	12,6 - 23,3	5,00		

1- Undernutrition - Encuesta de condiciones de vida (INEC) 2006/ Referencia WHO 2005 // WFP VAM, 2009
2,- Poverty by Consumption - Encuesta de condiciones de vida (INEC) 2006 // VAM, WFP, 2009
3- Vulnerability- VAM, WFP,2009
4- Climate Risk,- Vulnerability assessment Jubones River
Notes: Very High,- Regions that have a higher level of threat and a higher level of food vulnerability. / High,- Regions with a greater risk to climate impacts and food vulnerability./ Moderate,- Regions at risk of food vulnerability.
Source: SIISE 2010 // VAM, WFP, 2009 (See Annex IV Multi-threats Map; Annex V VAM Ecuador: food insecurity, erosion, frost and desertification maps, source Ecuador Country Office WFP; and Annex VI, Table of Social Indicators).

PROJECT / PROGRAMME OBJECTIVES:

The **overall goal** of the proposed project is 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 basin of the river Jubones.*

The proposed project includes two components with the following objectives:

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

Objective: Increase knowledge to manage climate change risks affecting food security in targeted cantons in Pichincha Province and in the basin of river Jubones.

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

Objective: Strengthen adaptive capacity of highly food insecure communities to respond to the impacts of climate change, including variability in targeted cantons in the Pichincha Province and MCRJ.

These components will be implemented at community level under the leadership of the MAE and in coordination with the MAGAP, through two management authorities. The first, under direct manage of the MCRJ and the second, under the Pichincha Provincial Government.

PROJECT / PROGRAMME COMPONENTS AND FINANCING

A detailed budget is presented in Annex X.

TABLE 3
Expected Results

Component 1-Objective	EXPECTED OUTPUTS[4]	EXPECTED OUTCOMES	AMOUNT (USD)
Increased knowledge to manage climate change risks affecting food security in targeted cantons in Pichincha Province and River Jubones basin	1.1.1. Communities in targeted cantons trained in climate change threats and adaptation measures which reduce vulnerability, in particular related to food insecurity 1.1.2. Targeted communities participate in adaptation and risk reduction awareness activities	1.1.Increased awareness of communities on climate change risks and food security related risks	141,600.00

[4] Based on the community adaptation plans concrete outputs and targets will be developed and included into the M&E plan.

	1.1.3. Food security and gender considerations integrated in all adaptation training programs		
	1.2.1. Canton and community adaptation plans developed to reduce vulnerabilities to climate change induced food insecurity in targeted areas 1.2.2. Community participation in processes to develop adaptation plans in targeted cantons 1.2.3. Agreements developed and signed among targeted cantons, GPP or MCRJ, MAE and WFP to implement adaptation actions 1.2.4. Women participated in processes and decision making to develop adaptation plans	1.2 Secured ownership of adaptation measures in communities in targeted cantons	523,200.00
	1.3.1. Community early warning system designed, implemented and maintained 1.3.2. Monitoring system in place to track climate events in targeted cantons 1.3.3. Monitoring system to track project results and lessons learned	1.3 Increased knowledge to manage climate change and risk, including climate variability affecting food security	740,200.00
Component 2-Objective	**EXPECTED OUTPUTS**	**EXPECTED OUTCOMES**	**AMOUNT (USD)**
Strengthen adaptive capacity to respond to the impacts of climate change, including variability in targeted cantons in Pichincha Province and MCRJ	2.1.1 Concrete adaptation measures based on community adaptation plans and designed 2.1.2. Physical assets created, improved or maintained. For example: a. Water harvesting and storage measures; b. Irrigation and drainage systems; c. Flood defences and climate proofed infrastructure (check dams,	2.1Increased adaptive capacity and ecosystem resilience in targeted rural communities	4,695,000.00

	etc.) 2.1.3. Natural resources assets created, improved or maintained. For example: a. Land reforested, original vegetation in moorland and grasslands, b. Improved Seed distribution 2.1.4 Identification of adaptation technology requirements. For example agricultural production systems in transition and measures to increase crop yields 2.1.5. Implementation strategy includes approach for use of incentives		
	2.2.1. Community participation, in particular participation of women, guide decision making processes for project execution 2.2.2. Communities share success stories and lessons learned	2.2Increased capacity at communities and institutional level to manage climate change risk in targeted cantons	229,200.00
			6,329,200.00
5. Project Execution cost	**(10 percent)**		**632,920.00**
6.Total Project Cost			**6,962,120.00**
7.Indirect Support Cost	**(7 percent)**		**487,348.40**
Amount of Financing requested	**US $**		**7,449,468.**

PROJECTED CALENDAR:

Milestones	Expected Dates
Start of project	July 2011
Midterm review	December 2013
Project Closing	July 2016
Terminal Evaluation	August 2016

PART II: PROJECT / PROGRAMME JUSTIFICATION

A. Project Elements

Project Strategy

Given the climate threats faced by the targeted provinces and cantons, including glacial melt reduced precipitation and more frequent droughts, and the anticipated effects on food security, the project will adopt a two pronged strategy: community based adaptation (CbA)[5] and ecosystem-based adaptation (EbA). The Project will help by reducing vulnerability of climate change induced risks and vulnerabilities in four provinces and 50 parishes of Ecuador. The strategy supports the aim of reducing vulnerabilities, in particular to food insecurity and increasing climate change resilience in order to maintain the water provisioning services of moorlands and forest lands, and maintain the productive capacity of agricultural lands. These three landscapes, in two watersheds, are the focus of the project. The targeting of these two major watershed areas will help to maintain resilience over extensive areas and provide a stronger buffer against climate induced stresses. A community based approach is typically lacking in most projects however it is a key element for the implementation of this project. A unique feature of the project is the integration of adaptation measures in food security strategies.

The project will support the execution of two national strategies (the strategy for climate change and the strategy for food security), by coordinating actions at the territorial level (provincial government) and watershed level. The implementation structure includes a direct link with and coordination among local entities (MCRJ, GPP) that work with communities and directly execute community adaptation plans; and with MAE and MAGAP at the central level.

The project will identify and implement a range of landscape based activities (agricultural, moorland and forest activities) that support improved water management. Activities will be selected through a participatory process that considers the ecological zone and community priorities. The strategy is grounded in the Ecuadorian experience that demonstrates that community-level adaptation requires awareness raising, increased knowledge, improved capacities and the continued provision of ecosystem services. By maintaining large-scale resilience, the flow of ecosystem services is secured and irreversible ecosystem regime shifts avoided.

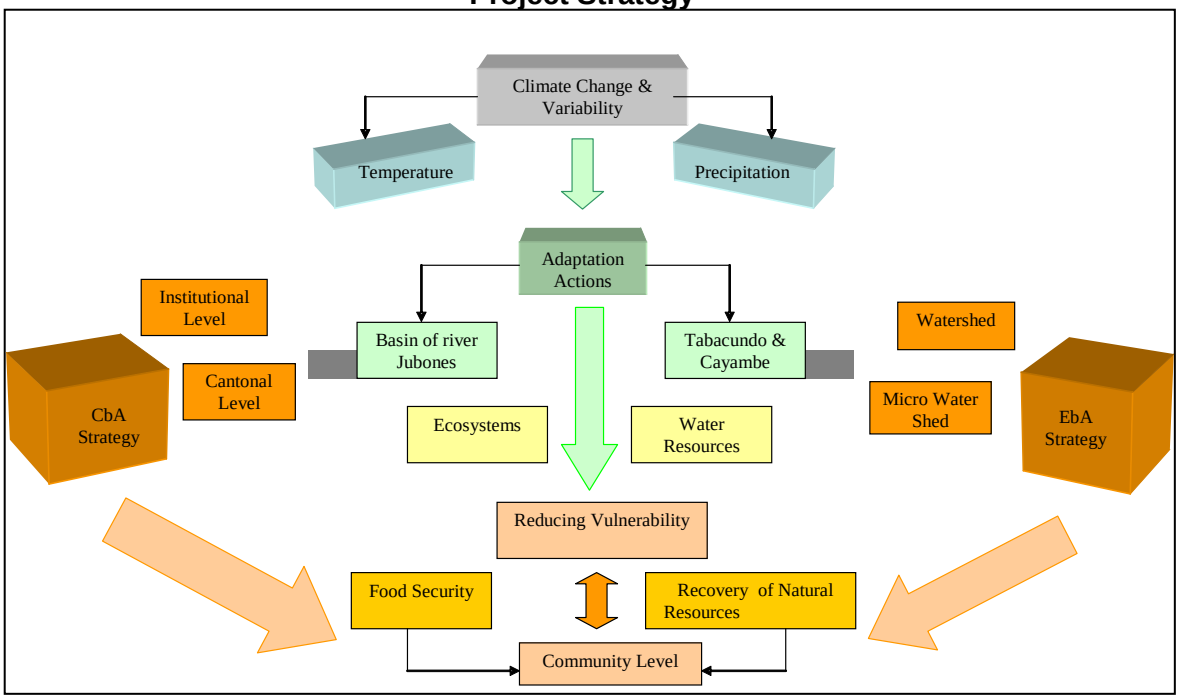
A main element of the strategy is to monitor and evaluate the effectiveness of the diverse community plans that will be implemented. MAE has a strong interest to review which activities are effective in helping communities adapt to climate change and which build ecosystem resilience. MAGAP is concerned about food security, considering production, access, utilization and stability at the local level in the face of climate change. The intention is that the Government will scale up community models that are effective in meeting these two aims. The process of updating the national climate change strategy is an opportunity for the Government, in

[5] Community-based adaptation (CBA) recognizes that communities already possess much of the knowledge and skills required to cope with the expected impacts of climate change. Communities can often increase their resilience to climate stresses by building on their own knowledge and skills. This strategy recognizes that environmental knowledge, vulnerability and resilience to climate impacts are embedded in societies and cultures. This means the focus is on empowering communities to themselves take action based on their own decision-making processes. (The 4th International Conference on Community Based Adaptation (CBA) to Climate Change, Dar Es Salaam, Tanzania, 21-27 February 2010.)

collaboration with WFP, to test implementation models that support community level adaptation to climate change across different sectors.

The proposed approach recognizes the importance of critical ecosystems and agricultural production systems in support of community food security, and as a means of support to the most vulnerable segments of the population. The project targets those cantons with high levels of chronic malnutrition and high risk of precipitation fluctuations and water availability due to climate variability and change. It also targets communities that will be most severely affected by climate related events and are least able to cope with increased climate variability. The focus on communities allows the project to target vulnerable households, in particular those headed by women and those with high levels of consumption poverty. In addition, the assessment of incentives, the payment for ecosystem services and the strategy to use incentives will be an important part of the implementation plan.

GRAPH 3
Project Strategy



Project components and activities will be implemented on the basis of a community strategies and plans, with special attention to the priorities of women and indigenous populations. With this focus, the project aims to have a greater impact at the local level, empowering communities to cope with climate change threats. The participatory process will foster the participation of at least 50 percent women in all planned activities, including decision making processes.

Project Targeting

The project will be implemented in four provinces: Pichincha, Azuay, Loja and El Oro and 12 cantons. Within these provinces adaptation plans and activities will be carried out in the communities of 50 parishes. The community selection will be based on indicators to measure climate, food security vulnerability and community organization. (See Annex VI and IX, E.)

Vulnerability criteria for the selected communities included:

1. Increase in frequency and severity of floods, droughts and landslides
2. Glaciers retreat affecting water supply
3. Forests and humid soil degradation
4. Degradation and contamination of water resources
5. Agricultural activities for daily subsistence and land tenure
6. Agricultural over exploitation

A census survey will be conducted in all selected parishes and communities with the aim of distinguishing vulnerable target groups, using the following criteria:

1. Households affected by chronic malnutrition, anemia, poor dietary diversity and insufficient food consumption
2. Household with livelihoods dependent on agricultural and ecosystem services
3. Households headed by women
4. High concentration of Indigenous populations
5. Households with more than six members.

Reducing Vulnerabilities

The proposed project will address the following climate threats and reduce vulnerabilities posed by these threats, in particular to household food security: increase in average temperature, the retreat of glaciers, moorland degeneration and desertification, forest loss, and an increase in the frequency of extreme events. The project will support an integrated set of community based adaptation interventions that aim to reduce vulnerability and strengthen resiliency.

Activities will contribute to reducing the direct impacts of these threats on local food security, improving community resilience to cope with climate change threats and to reducing economic and human losses at local level. Project activities will develop awareness of climate change threats, disseminate information and transfer knowledge so that local communities can adapt to climate change threats. Specific activities include training, awareness raising, adaptation plan development, implementation of early warning systems and implementation of specific physical and natural resources assets, as tangible measures to reduce local vulnerabilities.

Community adaptation plans will identify community priorities which support the implementation of adaptation measures to increase capacity to mitigate the impact of these threats. Specific adaptation measures will be in identified, in a participatory process with the selected communities, in response to local threats and include water conservation and storage measures, reforestation and protection of vulnerable landscapes and preparedness measures to mitigate the impacts of extreme events including measures to reduce soil erosion and control runoff. These adaptation measures will help ensure that the poorest communities have the capacity to adapt to climate change impacts without further eroding their food security.

Project Components

As part of the project baseline, an in-depth vulnerability assessment to identify local climate threats will be undertaken using WFP's 2010 VAM. The assessment will also inform canton level planning and guide the development of community level adaptation plans. The assessment will be carried by GPP and MCRJ, in coordination with WFP, MAE, MAGAP and the National Institute for Meteorology and Hydrology of Ecuador (INAMHI). (See Table 4 for consultation arrangements.) Through the assessment will be based on the following: climate change risk indicators, socioeconomic indicators, and food security indicators including food consumption habits, constraint to accessing food, and agricultural practices. All indicators will be assessed by gender, and data will be disaggregated by gender and socio-economic groups. Secondary data sources will include: climate risk maps, watershed and micro-watershed inventories, and food and nutrition data from health centers, INAMHI metro- logic data, and other local monitoring systems.

The project will be implemented through two components and monitoring and knowledge management will be important elements of both components.

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

Objective: *Increase knowledge and capacity to manage climate change risks affecting food security in targeted cantons in Pichincha Province and in the river basin of Jubones.*

This component will support the national strategy for climate change by addressing local exposure to climate change risks and high vulnerability, in particular to food insecurity. This component will raise awareness and understanding of climate change threats, adaptation solutions, and the need for action at community level. This component will also work to ensure that MAE and MAGAP mainstream climate change adaptation into provincial sector develop strategies. The project will work at three levels, provincial, canton and parish/community, with particular focus on the community level. However, coordination will be strengthened among the three levels through project activities.

This component includes three outcomes and ten outputs aligned to activities which aim to develop awareness, knowledge, and commitment among key stakeholders to respond to climate change threats. The component will help to address challenges related to integrating adaptation to climate change in development planning, in particular as it relates to improving food and nutrition security. Participatory methodologies, tools and planning approaches will be developed as part of the project, with the aim of broader application in other watersheds of Ecuador.

Output 1.1.1, 1.1.2, and 1.1.3: will focus on vulnerable communities in targeted cantons and special efforts will be made to ensure the participation of women and vulnerable groups. Working through GPP and MCRJ officials in coordination with MAGAP and MAE, local staff will develop and implement an awareness campaign to inform local officials and communities of the threats to climate change and potential adaptation solutions. In addition a training module will be developed to help officials and communities assess local threats. These activities will give particular attention to the threats that climate change posses to production systems, water management and food and nutrition security. A gender approach will be integrated in all training

modules and awareness campaigns. Capacity will be built to assess changing threats and incorporate threat information into local planning and sector projects.

The project management team will work with local communities to ensure that community plans support priorities at the canton level. Plans will be supported by implementation schedules, including the technical inputs to be provided by MAE, MAGAP or others. Agreements will be signed by relevant stakeholders, including with communities, targeted cantons, Pichincha Government or MCRJ, MAE, MAGAP and WFP for the implementation of adaptation plans*.* Coordination among the various stakeholders will be a crucial role of the project management team.

Output 1.2.1, 1.2.2, 1.2.3, and 1.2.4: In support of the national climate change strategy, canton level adaption priorities will be assessed and presented in an adaptation plan. In accordance with priorities to reduce vulnerabilities to climate change, in particular vulnerabilities related to food insecurity, a participatory process will be developed to engage all members of the community (see Annex VII). Participatory workshops will be carried out by GPP and MCRJ, under the guidance of MAE and in coordination with the MAGAP. The institutional framework for community based planning will be strengthened in line with the Government of Ecuador's National Development Plan. Workshops will be conducted, with a focus on two main themes: the context of climate change risks, mitigation and adaptation solutions with consideration of both community livelihoods and ecosystem integrity and the services these ecosystems do or can provide. In addition, workshops will integrate topics on food sovereignty and food security. These workshops will result in increased participation of communities, in particular women, in finding solutions to climate change threats and concrete plans which will be implemented through Component 2 of the proposed project.

Critical technical information is required to support decision making at local and national level. Through ***Outputs, (1.3.1, 1.3.2, and 1.3.3)*** tools will be developed to assist officials and communities to better understand climate threats. *C*community early warning systems will be designed, implemented and maintained. This tool will be especially important for deciding on context specific adaptation investments based on local risks and hazards. Early warning systems will also help in updating climate related risk maps (hazards, vulnerabilities and impacts) and in refining socio-economic and food insecurity indicators.

Developing a system for knowledge management and evidence- based decision making is key to the government's intention to draw lessons and replicate adaptation models that generate results in different contexts ***(Output 1.3.2).*** A monitoring system will be developed to track climate events and trends in targeted cantons. In particular systems will be developed with INAMHI (and be aligned with the systems of SNGR) to support weather monitoring and forecasting systems. These systems will be installed at the local level and be linked with national systems.

As part of the project monitoring plan, GIS tools will be used to track changes in the Jubones river basin and the targeted watershed in Pichincha. Spatial presentation of the project will allow the Government of Ecuador to map investments by project types and other relevant parameters at local and provincial level. Another aim is ***Output 1.3.3*** which will disseminate planning and results information, including the tracking of selected outputs and outcomes, as outlined in the project log frame. A further aim of the monitoring system to support the development of a common knowledge repository for climate change adaptation results. The use of GIS, combined with early warning information, will allow the project to track project results related to food and nutrition security and the reduction of climate risks.

TABLE 4
Consultation and Participation

Areas of Consultation	Level of community participation
Institutional level: • Conceptualization of climate change, food sovereignty, food security linkages • Situation and threat analysis • Identifying of priorities at the provincial/watershed level • Methodologies developed	MAE Without community involvement
Canton level: • Identifying of priorities at the provincial/watershed level • Priorities guide community consultations • Analysis and prioritization of adaptation measures • Canton adaptation plan approved	GPP and MAE MCRJ and MAE Involvement of community leaders
Community level: • Community awareness raising and consultations • Community plan prepared • Consensus reached on plans • Consensus reached on implementation schedules and agreements signed at appropriate levels	GPP, Mayor, MAE MCRJ and MAE Full Community participation

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

Over half of project resources will be used to implement concrete adaptation actions at the community level, with the aim to reduce vulnerabilities facing climate change threats. These actions will be focused on the construction or maintenance of physical assets for a greater resilience facing climate change events, as well as activities that will maintain or restore the ecosystems in order to mitigate on going climate change adverse effects.

Actions regarding physical and natural resources assets to improve adaptative capacity and reduce vulnerabilities, at the communitarian level, will include an incentives strategy. The incentive strategy that will be used as a pilot initiative, incorporating payment for ecosystem services and incentives such as cash and/or vouchers assets developed or maintained. An analysis will be made in each community to identify the best mechanism, considering lessons learned from WFP´s past experiences and community needs.

Objective: *Strengthen adaptive capacity of highly food insecure communities to respond to the impacts of climate change, including variability in targeted cantons in the Pichincha Province and MCRJ.*

Component 2 focuses on the implementation of concrete adaptation actions. In line with the priorities of cantons, communities will select from a menu of feasible concrete adaptation activities. These activities will be designed with support from MAGAP and local sector experts to

ensure high technical standards ***(Output 2.1.1).*** These activities will increase adaptive capacity and ecosystem resilience in targeted rural communities and can be grouped into two categories: the construction and maintenance of physical assets ***(Output 2.1.2)*** and the creation and enhancement of nature resources and ecosystem integrity (***Output 2.1.3***). Physical assets and infrastructure may include for example water harvesting and storage measures, irrigation and drainage systems, flood defense and other climate proofing of infrastructure, such as check dams and storage tanks. These actions will help to maintain water supplies and provisioning services, partially through the reduction in the wastage of water and the promotion of sustainable practices. As well, provisioning services will be supported by efforts to manage water demand based on climate change scenarios and the expected precipitation decreases. Local strategies will give particular attention to securing access to water for the most vulnerable populations. However the strategy must also consider vulnerabilities to floods and landslides that may be exacerbated by climate change.

Biological measure and natural resource conservation will also be part of the menu of options that would be implemented as part of the watershed approach; based on the community adaptation plans. For example, actions will stabilize hill slopes vulnerable to landslides, restore forest and vegetative cover to conserve water and reduce erosion in moorlands and forest areas, and improve agricultural practices to conserve water and maintain or increase yields on a sustainable basis to respond to climate threats. All activities will be part of a comprehensive package of interventions that will serve as models with high replication potential in other water stressed areas of Ecuador.

Output 2.1.4 is a priority of GPP and MCRJ to fill existing gaps in adaptation related technology and the transfer of appropriate technologies to address specific climate threats. Through this activity the project will work with local experts to identify adaptation technology requirements. For example agricultural production systems in transition require new technologies to ensure adequate seed sources, drought resistant varieties and other measures to increase crop yields.
All adaptation measures will be executed by GPP and MCRJ, in coordination with local government programs, including sector (forest, water and agriculture) and social programs. Specifically activities will be implemented in coordination with MAE programs, Forest Partner and Moorland Partner. Both programs include payment strategies for environmental services, in particular for the restoration of forest and vegetation cover.

As compensation for natural resource management is a practice in Ecuador, an assessment of incentives and the strategy to use incentives is an important part of the implementation strategy. If it is established that incentives are an appropriate and useful tools in the targeted watersheds, the use of cash or vouchers will then be assessed based on criteria such as the availability of financial institutions, markets and security considerations. Using WFP's experience of working with cash and vouchers to involve vulnerable groups ***(Outputs 2.1.5)***, an assessment will be undertaken to determine if and how cash or vouchers should be used to compensate or motivate community members for their participation in community based natural resource activities. The analysis will consider if there is a need to encourage communities to participate to build or restore physical infrastructure, to reforest or vegetate forests and moorlands respectively, or using biological conservation measures to protect the water resources of Cayambe. Considerations of sustainability, social benefits to be derived and the level of community vulnerability will also be factored into the decision to include an incentive strategy in the project.

As the proposed project will implement targeted adaptation actions to reduce climate change variably risks, community participation in decision making processes for project execution is

crucial (***Outputs 2.2.1)***. This output makes the distinction between carrying out activities or being compensated to participate in an activity, with a clear role in decision making in all aspects of planning and execution. The project aims to ensure that communities, in particular women and vulnerable groups within a community, contribute to defining and prioritizing adaptation measures.

As the project proposes a comprehensive set of adaptation measures with high replication potential, the project will systematically capture lessons and practices. Central to the generation of lessons and practices is the opinions and views of communities (***Output 2.2.2***). Communities also will share success stories and lessons through workshops as an input to the knowledge management component of the project. These lessons will also contribute to increased awareness, by bringing visibility, not only to the threats of climate change and variability, but also to the potential of adaptation response options in diverse contexts.

An aim of the project is to develop capacity at local level to ensure the technical quality of community project designs. An important sustainability element is the role of the community in developing and implementing community plans. Establishing ownership is central to project sustainability. Payments for ecosystem services would be integrated in community plans and provided as part of project start up. It is not anticipated that payments would continue after project start up. Payments would be made using the mechanisms WFP has established in country to make transfers using either cash or vouchers. Payments would be viewed as incentives for poor vulnerable people to participate in natural resource activities that produce social benefits. See Attachment 2: Sustainable Maintenance of programme outputs for more details.

The agriculture and forestry sectors are vital for economic and social development in the country and are linked to the promotion of other productive sectors. The Ministry of Agriculture, Livestock, Aquaculture and Fisheries is responsible for the implementation agricultural policies, in line with the National Climate Change Strategy and is one of the strategic partners of this Project. The new Constitution of the Republic (2008), the National Development Plan of (2009-2013), Heritage Policy, Water Management Plan, and the Law for Land Tenure, among others regulate the sustainable use of the agriculture, water and forest resources. The land tenure policy is in force and would be adhered to for the implementation of this project. The project will put particular attention towards to ensure that the poorest have secure ownership of project benefits and services.

B. Socio Economics Benefits

Ecuador faces multiple hazards and presents a wide range of vulnerabilities to climate change. The effects of climate change are expected to intensify over the coming years and decades and the most vulnerable will be adversely affected. Surface water resources and the richness of its soils allow you to cover all their food needs and generate exportable surpluses. The coastal area is promising for a number of productive activities: the main fishing, farming, mining and tourism. It has significant mineral and hydrocarbon reserves (Noboa, 2002: 5).

As the distribution and availability of water resources change over time, production systems and water use practices will need to be modified. Deliberate and planned adaptation to climate change requires an iterative and community based approach that enables the adoption of sound development choices in the face of uncertainty. It also involves different sectors and levels of society.

In the absence of this project, the baseline scenario would see continuing deterioration in ecosystem integrity, production systems, and household food security. Specifically the project addresses the effects of climate change and climate vulnerability on ecosystem services and water availability, production systems, and food availability and consumption (considering quantity, quality and stability). Rising temperatures and water shortages are already affecting the production of major crops, including:

- Changes in rainfall patterns increase the likelihood of crop losses in the short term and reduction of long-term production.

- Climate change will lead to an additional increase in the price of major crops such as rice, wheat, corn and soybeans. This also implies an increase in animal feed costs which will result in an increase in meat prices.

In addition, climate change may affect the physical availability of food due to temperature and precipitation change:

- Climate change may negatively influence people's access to food by reducing income from coastal fishing because of rising sea levels.

- Climate change may influence the reduction of foreign exchange earnings by the destruction of export crops as a result of catastrophic events.

The approach considers how altered rainfall patterns require modifications to farming and natural resource practices, which require laying the foundation for household and community behavioural changes in order to improve food security. The project proposes an integrated set of community based interventions that aim to reduce vulnerability and strengthen resiliency, recognizing the in some cases incentives will be required. Payment for ecosystem services would encourage and facilitate the participation of the most vulnerable. With cash, communities can participate in adaptation activities, while investing in productive asset-building activities which strengthen long-term resilience.

Specific benefits of the project will include stabilized water use to support agriculture production and ecosystem services. The main beneficiaries of the project will be the local governments and local communities with a population of over 200,000 vulnerable members in the four provinces. The project will give priority to the most vulnerable communities. In line with the Government’s policy to reduce inequalities in Ecuador, between urban and rural and between various population groups, the project will benefit highly food insecure vulnerable rural communities. Selection of communities will be based on criteria such as the chronic malnutrition levels, poverty rates, frequency of natural events, water shortages and quality, and degree of local natural resource degradation, including agriculture land, moorland, and forests.

Additional benefits of the intervention are related to improving family incomes through a:

- Reduction in production losses due to the negative effects of climate variability;

- Productivity and quality increases in the local production;

- Increase in environmental goods and services (timber and carbon); and

- Reduction in local migration rates.

Environmental as well as social benefits are an instrumental part of the project concept and design. Improved access to quality water supplies is a main anticipated benefit that will support livelihood and food security objectives. It is also anticipated that improved soil maintenance will enhance agricultural productivity as well as prevent soil erosion. Small-scale interventions, based on an adaptation plan made with the participation of the community and led by the local governments, will help to mitigate negative environmental impacts.

Specific environmental benefits include:

- Reduction of soil loss in areas sensitive to erosion;
- Improved water management systems and access to water; and
- Protection and recovery of biodiversity with the use of native and adapted species.

C. Cost effectiveness of the purpose project

The Government of Ecuador's strong policy, strategy and planning platform offers the opportunity to incorporate climate change adaptation in community natural resource management, food and nutrition and disaster risk reduction strategies. As Ecuador already faces severe water problems in a number of sectors, this early attention to the links with food security, offers the opportunity to avoid or at least mitigate emergency situations.

The emphasis on participatory decision making, landscape level interventions, and an integrated approach enhances the cost effectiveness of the project. The project will emphasize cost effectiveness with all project activities. Detailed cost effectiveness analysis will be made, for each community adaptation plan, using a methodology developed by WFP, comparing measurable outcomes with all feasible options and risk analysis, in order to ensure that least cost options are selected during project design and implementation.

To improve cost effectiveness, the project will address the issue of ad-hoc and small scale adaptation efforts. The project strategy emphasizes coordination between different organizations and full involvement of communities. The strategy considers that fragmented responses may address a local issue, however, without a combined community based and ecosystem based approach it is unlikely that context specific actions which meet the priorities of local populations will be implemented. The project will help address this concern of the government. The project approach specifically aims to reduce fragmentation by targeting watersheds, and promoting an ecosystem approach. Small add hoc activities also lead to externalities and are hard to bring to scale. The proposed project aims to achieve a large scale impact and avoid externalities as actions will be the priority of affected communities. The integrated approach of community based and ecosystem based approaches will promote an integrated package of measures that will build knowledge, awareness, tools and local capacities to address the threats of climate change.

The project's participatory approach will involve local people in: managing natural resources, meeting social needs (maintaining local culture, increasing opportunities for income generation, and improving food security and well-being), and sustaining outcomes over time. Implementing concrete adaptation activities with community groups can be cost effective when well executed.

The participatory approach should also cover the management of natural resources, the process to recover ancestral knowledge to reduce and mitigate climate change related risks (maintaining local culture, increasing opportunities for income generation, and improving food security and well-being), and the sustainability of environmental outcomes over time. In summary, implementing concrete adaptation activities with the participation of communities will lead to the cost effective implementation of the project.

D. Consistence with the national and sub-national sustainable development strategies

The project is well aligned with the defined priorities of the National Environmental Policy (Policy 3, MAE 2010). Specifically the proposed project will support the government's policy to manage the adaptation of ecosystems and community needs with respect to climate change. The project is aligned with two national priorities:

- Mitigate the impacts of climate change and other events natural on population and ecosystems.

- Manage the inherent risk associated with extreme events linked to climate change.

The Second National Communication which is being finalized defines as a priority adaptation measures and policies which support vulnerable communities and prioritizes watersheds. The project also supports the Government's national plan and the priority of developing national food sovereignty. With a focus on addressing threats to food production and access, the project will contribute to putting Ecuador on a more firm path towards food security. Specifically, the project supports the government's strategy of promoting the implementation of adaptation programs, with particular attention to vulnerable and fragile ecosystems, food sovereignty, and inter-institutional coordination among different key partners. At the regional level the project addresses critical natural resources and social development needs.

E. Meeting national technical standards

Project appraisal will consider quality programming standards based on Government of Ecuador norms and standards for different sectors. The necessary safeguards will be followed and incorporated into the project design. In addition, the proposed interventions will adhere to all national technical standards that are in force, particularly those relating to water harvesting and control structures. The project will also identify gaps in appropriate sector technologies aligned with adaptation needs and identify possible solutions including sources of technical assistance and transfer modalities.

F. Duplication

While Ecuador has a number of climate initiatives underway, they do not address community based adaptation needs and they do not address the effects of climate change on food security.

Specifically, the targeted cantons are not part of any other climate change adaptation project, with the proposed approaches.

The project supports government's priorities and is in line with the 2010-214 UNDAF for Ecuador which states:

> *WFP will work with the most vulnerable populations through food based assistance in support of literacy, climate change and other social development activities at the community level.*

A review of on-going projects shows that there is no duplication of the proposed project with other projects financed by bilateral or multilateral organizations, as this project would be the first one to explicitly focus on improving the resilience of communities and ecosystems, as an adaptation strategy. This project expects to complement other initiatives that are already being implemented at territorial level.

During design process, all stakeholders including donor funded projects were consulted, in order to avoid any potential duplication of efforts, resources or geographical coverage, and to ensure synergy between the ongoing initiatives and the proposed project. The project is expected to complement ongoing initiatives by bringing in the CbA and EbA approach to address climate change threats.

The project will also coordinate and learn from the GEF project Ada*ptation to Climate Change through Effective Water Governance in Ecuador*. While there is an overlap with two provinces (Azuay and Loja) the micro watersheds selected for this proposed project are different. The project will gain from the experiences ongoing in Ecuador, for example FAO's work at watershed and micro basin level and its work on seed sources and seed dissemination. (See Table 5).

The focus of this project and of the GACC (implemented at a national level) aimed to strengthen the adaptation capacity and, in some cases, to reduce people's exposure or sensitivity to climate change impacts through advocacy, awareness raising and communication. The difference is that it recovers the ancient knowledge of the communities, and it also takes measures to assure that our projects/ development programs contribute, when possible, to strengthen the resilience of people and to avoid inadvertently worsen their vulnerability condition. These two processes are essential to tackle the challenge of global adaptation.

TABLE 5
Complementary Projects Under Execution

PROJECTS	OUTCOMES	COMPLEMENTARY LEVEL	AVOIDANCE OF OVERLAP MECHANISM	
			COVERAGE	MECHANISM
Adaptation to Climate Change through Effective Water Governance in Ecuador - PACC Ecuador (MAE)	1. Strengthened Policy Environment and Governance Structure for Effective Water Management 2. Improved Information and Knowledge Management on Climate Risk in Ecuador 3. Application of Sustainable Water Management and Water-Related Risk Management Practices to Withstand the Effects of Climate Change	This project proposes a top down approach to improve the planning and policy formulation of water resources. This project addresses a key policy dimension of implementing an adaptation strategy. It focuses its intervention at the political level. .	Chone Portoviejo Babahoyo Paute Jubones Catamayo	Jubones is same area targeted by the proposed project. Therefore the proposed project will ensure coordination at all levels. As the watershed includes three provinces, the proposed project will avoid overlap in data collection and institutional capacity building activities in the Jubones watershed. As the proposed project will be implemented at local level with full community participation, with MAE and MAGAP and a focus on food security the concept of the projects are very different. However the project will ensure information sharing and complementarities.
Adaptation to the impact of rapid glacier retreat in the tropical Andes Project - PRRA Peru, Bolivia and Ecuador (MAE)	Integration of the issue of glacier retreat in regional/local planning.	This project is focused on strengthening the resilience of local ecosystems and economies threatened by the impacts of glacial retreat.	Antisana glacier	No overlap in area. The project will ensure coordination and draw on the experiences and lessons of the regional project.
Partner Forest and Partner Moorland	Delivering an annual economic incentive per	This is a national initiative supported by MAE. The	Country wide	MAE and WFP will ensure coordination and

(MAE)	hectare to indigenous communities that voluntarily commit to the conservation and protection of native forests, moorland, or another native vegetation	proposed AF project will draw lessons from the national initiative and will ensure to complement other incentive actions		complementarities.
Investment Project Management of Adaptation to Climate Change GACC 2010-2014 (MAE)	Strengthen the capacity of social systems, natural and economic resources to respond to climate change impacts	The project generates information tools on the causes and effects of climate change in the country.	Country wide	Develop several consultancies, including Design "National Communication and Awareness on Climate Change" It is mandatory to have the participation of social communicators, as well as of professionals on information and knowledge management, to integrate their inputs to the process of building the program
Green Pichincha (GPP)	1. Agricultural frontier controlled in order to protect the moorlands 2. Communitarian nursery built and maintenance with the Community participation 3. Activities coordinated with others institutions such as Colegio de Ingenieros Forestales, FONACC, INAMHI, PUCE	The main objective of this project is to reforest big areas of the province in order to preserve sensitive areas and to protect water resources.	Pichincha	This project response to the priorities establishes in the Development General Plan 2002. For the execution of the project, GPP coordinates with the communities through the parish authorities. Pichincha is same area targeted by the proposed project. Therefore the proposed project will ensure coordination at all levels. In addition, GPP is and will be local executing institution of both projects.

Hydro-meteorological Stations Project (GPP)	Semiautomatic technology installed in the Hydro-meteorological stations of the province. This project will be executed during 2011.	In Pichincha, there exists an hydro-meteorological stations network, but it is poorly equipped. For this reason, the purpose of this project is to provide these stations with a semi-automatic technology to generate climate information and weather forecasts	Pichincha	This project is executed in coordination with INAMHI. Pichincha is same area targeted by the proposed project. Therefore the proposed project will ensure coordination at all levels. In addition, GPP will be local executing institution of both projects.
Support to the Natural Risk Management System in the province of Pichincha (GPP)	SGR-P will be constructed to share important information for planning activities. This project has 2 components: Diagnose of risk management at local and provincial level. And, support to the formulation of SGR-P	The objective of this project is to support the strengthening of Natural Risk Management System (SGR-P), in order to improve the prevention, mitigation and preparation capacities against adverse natural events, to reduce population vulnerability in Pichincha.	Pichincha	There are some interesting studies of local risk management in Pichincha, however, they are just focused on Quito. Based on those investigations, GPP tried to evaluate risks and hazards in Pichincha but it was not possible. For this reason, GPP identified the information needs as a priority. Pichincha is same area targeted by the proposed project. Therefore the proposed project will ensure coordination at all levels and GPP will be local executing institution of both projects.

G. Learning and Knowledge Management

The project gives high priority to monitoring and knowledge management and both local and national governments attach high priority to generating lessons, avoiding duplication and replicating best practices. The proposed project will build on the experiences and lessons of on-going initiatives in Ecuador, in particular those related to community based development and specific sectoral lessons. The Government of Ecuador views this project as a learning model that will allow national and local governments the opportunity to review context specific approaches, establish best practice and scale up successful activities to achieve a landscape-scale resilience approach (watershed or river basin). The project will emphasize the capture, analysis and dissemination of lessons and best practices, featuring which adaptation responses are most appropriate for specific ecological and social contexts.

WFP Ecuador has included knowledge management and evidenced based programming as part of its country strategy. Thus WFP will take the lead in all activities related to monitoring, evaluation and knowledge management, in line with its corporate procedures.

During the design process an evaluation strategy will be developed and aligned to the expected outcomes of the project. Evaluation in addition to monitoring will provide the basis for the evidence based approach proposed in this project. Also during appraisal, the need for special studies based on the overall objectives of the project will be assessed.

The emphasis on knowledge management is in line with Government of Ecuador priorities and will fill a gap in MAE's current implementation capacity. The knowledge management activities in the project will draw upon national actors and capabilities, and include community based monitoring and evaluation.

H. Consultative process

WFP and MAE have worked, from the beginning, in close coordination on the formulation of this project. Therefore, this is a joint project and it is formulated to support government policies. MAE and WFP held a joint workshop to identify priorities and explore how the two entities could work to jointly address adaptation need in Ecuador. As a result of this first workshop MAE officially asked WFP to join in its climate change efforts and a letter of agreement was signed (see Annex VIII). MAE has officially coordinated with MAGAP.

Future consultations organized through MAE brought together experts to discuss and identify the major climate threats in Ecuador and the geographical areas most at risk. From these discussions watersheds and river basins with ongoing activities were eliminated and a final selection of the geographic areas was made. WFP and MAE worked together in the analysis of data and available information to ensure the targeting of cantons with high levels of food insecurity and climate risks.

Local consultations were also held with Provincial officials. Important in these discussions were the agreement to develop a community based approach and the identification of provinces and cantons based on WFP vulnerability assessment and local level climate threat information. A meeting was held with national and provincial stakeholders to review this document and views were incorporated accordingly.

I. Justification for funding requested and focusing on the adaptation

Component 1- Baseline without Adaptation Fund Support

The Government of Ecuador has established a solid policy framework to address climate change threats, culminating in the Second National Communication to the UNFCC. Most measures to address adaptation have been at the institutional level and concrete actions have been ad hoc. Disaster risk reduction is a priority for the government and WFP is working closely with SNGR, however actions have not moved passed the planning stage except for emergency response where concrete measures are in place. Further the water sector has been a priority since the First National Communication. However, climate change and variability risk factors have not bee fully recognized at provincial, canton or community level.

It is recognized that emergency response and short term measures do not lay the foundation for addressing the longer term climate change threats that are very real in Ecuador. MAE recognizes the gaps in tools, capacities and information needed to assess climate change threats and the importance of involving communities in developing adaptation actions and models that will help buffer communities from the exposure to natural hazards. Without this project, adaptation planning in Ecuador will be much slower to address the threats to food security.

Adaptation Alternative

Adaptation Fund resources would support the transition from a focus on planning and strategy at the central to level to the implementation of concrete actions at the local level. While sector specific projects are under implementation, they do not promote an adaptation focus. They do not consider the impact on food security which is a government priority. The proposed project would help make this transition by bringing together the two main ministries which deal with these two areas – MAE and MAGAP. Further it would step up coordination mechanisms with provincial and canton government officials, with the aim of integrating climate change threats into local planning and the implementation of sector activities. In addition, the project aims to involve the private sector, whose presence is limited in climate change actions.

The project will promote the incorporation of recognized cultural knowledge to address climate change risks and develop community plans to solve problems locally. It will help raise awareness of risks related to variations in temperature and precipitation, and the risks associated with glacial melt. Communities and in particular women, will be involved in planning and designing local solutions. Through a participatory planning process local people will gain knowledge and understanding and be empowered to drive local solutions to respond to climate threats.

The project will promote the generation and use of climate information in an institutionally coordinated manner, through the linking of local early warning systems with regional and national systems. Information from local levels will also inform contingency plans, which at the moment are developed and in force only at the national level. The generation and dissemination of climate information will not only fill stated gaps but also contribute to the government's emergency preparedness measures. Appropriate tools for climate change

monitoring and planning at local level are important elements of Ecuador's national climate change strategy.

WFP will assist the government in strengthening its threat, risk and vulnerability analysis capabilities by expanding its current Vulnerability and Analysis methodologies to overlay climate threats and monitoring changes in landscapes using GIS technologies. WFP has agreed to provide a small amount of funding to develop this capacity but the government still seeks additional funds. This project would provide the additional support required to develop vulnerability and analysis capabilities.

As result of linking central level planning with local level plans and community monitoring, the Government of Ecuador will have a wider evidence base upon which to strengthen its own institutional capacities to address climate change threats and promote local level adaptation to climate change.

Component 2 - Baseline without Adaptation Fund Support

Without concrete adaptation actions, the baseline scenario would see continuing deterioration in ecosystems, production systems, household food security, and livelihood security.

The targeted cantons are highly vulnerable to climate threats and food security. Water scarcity is the predominate threat; however in some cantons intense flooding destroys crops and forces temporary location. At the moment concrete adaptation measures are ad hoc, do not receive adequate funding, and do not involve local communities in planning. Unless concrete adaptation measures are planned and implemented locally, vulnerability to threats and food insecurity will only increase.

Across Ecuador there remains a large gap in awareness regarding appropriate adaptation measures. Rather a sector by sector approach continues, without considering the adverse affects of climate change and possible solutions in sectoral actions. As noted above, vulnerabilities are only increasing and without support from the Adaptation Fund, the targeted vulnerable areas and communities would receive no adaptation to climate change support. In particular local adaptation measures to address food insecurity, while embedded in national policies and strategies, would not be translated into concrete actions at the local level where these vulnerabilities are most deeply, rooted.

Adaptation Alternative

With a combined strategy that integrates community based adaptation with an ecosystem approach, demand driven adaptation actions will be implemented, based on the priorities of cantons and communities. The targeted water sheds are critical for local populations for food production and income generation. Presently there are no clear mechanisms in place to protect forests and moorlands. In addition there are no incentives in place for poor food insecure local communities to protect, conserve or enhance these resources.

The project will indentify, design and implement through a consultative process involving stakeholders at provincial, canton and community level, adaptation mechanisms. Payment for environmental services or incentives for actions to protect forest and moorlands will also be introduced as appropriate. Based on sound analysis and planning, these actions will expand and enhance resources in the targeted watersheds, and promote sustainable land

and water management. These actions will include reforestation, water storage, moorland protection and regeneration, and improved agriculture practices.

It is anticipated that Adaptation Fund resources will help to leverage additional resources from government authorities, and that documented successes, combined with awareness raising, will promote local spontaneous adaptation responses to climate change threats. As well MAE, will be able to assess which adaptation actions generate the highest return, in specific contexts. With adaptation plans in approximately 120 communities, linked to 12 canton level plans in 4 provinces in two distinct ecological zones, MAE and MAGAP will have the elements of a data base for evidenced based decision making. The aim is that with these initial findings the two ministries will be able to replicate and scale up context specific local adaptation measures that specifically address food and nutrition security.

PART III: PROJECT MANANGEMENT MECHANISMS

IMPLEMENTATION ARRANGEMENTS

A. Arrangements for Project Implementation

The Government of Ecuador has prioritized the environment and specifically climate change mitigation and adaptation in its policies and strategies. The Ministry of Environment is responsible for formulating and implementing all adaptation to climate change measures. MAE, as the lead for the management of climate change in the country, invited the United Nations World Food Programme to work together to develop actions that will contribute to the implementation of its national policies and strategies.

In line with the National Environmental Policy and the National Strategy of Climate Change, this project will rely on a wide range of partners to enhance adaptation capacity and build resilience. Community participation will be essential to the success of the project. As well, partnerships and coordination among the key stakeholders is a key aspect of project implementation. Therefore, the start point of the project will be to sign a Cooperation Agreement between MAE, WFP, MCRJ, GPP, and other interested institutions at national level. Also, in order to execute the project, it is necessary to establish Local Cooperation Agreements between local executing agencies (MCRJ, GPP) and the parish councils in targeted areas. Those legal mechanisms permit to guarantee institutions commitment, specific responsibilities and even functions of each institution involved in the process.

For the purpose of ensure coordination at all levels, it is crucial for the project that the main roles of national and local stakeholders are defined and agreed even during the process of project design. Each institutions involved has its own scope of work in an environmental or risk management field. However, despite of many efforts, there are still overlapping or not well defined functions between institutions in their daily work, which could cause confrontations. For this reason, in order to avoid any institutional conflict or misunderstanding at national or local level, it is essential to define a precise and clear stakeholder roles description. (See Annex 9 for full implementation details.)

The main actors involved in the project include:

- **Ministry of Environment (MAE)** is the technical focal for the UNFCCC, located in the Under Secretary of Climate Change. This Ministry is the governing body responsible for the formulating and implementation of strategies of adaptation and mitigation to climate change as a State policy. MAE is responsible for coordination and inter-agency coordination and implementation of actions and measures of awareness and education on the issue of climate change.

  It should be noted that recently in 2009 there were two major changes at national and institutional levels, on the first place adaptation and mitigation to climate change was declared a State policy, and second the Under Secretary of Climate Change was established as part of the organizational structure of the MAE, (Executive Decree No. 1815, 2009)

  Through this legal instrument, the Ministry is responsible for "the formulation and implementation of the national strategy and the plan that will allow to generate and implement actions and measures towards the awareness increase in the country on the importance to fight against this natural and anthropogenic process with the inclusion of coordination and articulation inter-institutional mechanisms "(Executive Decree No.1815, 2009). The exposed legal framework enables the formulation and subsequent implementation of the National Program of Awareness and Communication on Climate Change.

  In 2010, the Inter-institutional Committee on Climate Change which is comprised by several national-level institutions was established: the Planning, Water, and Risk Management Secretaries; the Ministries of Heritage Coordination, Strategic Sectors, Production, Social Development; and the government ministries of Environment and Foreign Affairs. This Committee assumed the functions of the former National Climate Committee, with the Technical Secretary as the Climate Change Under-Secretary.

  Thus, MAE through the Under Secretary of Climate Change is responsible for the inter-institutional and inter-agency coordination to implement actions and measures oriented to education and awareness on the issue of climate change.

  Therefore, this project will be under the responsibility of the Unit for Climate Change Adaptation of the Under Secretary. MAE is WFP's main partner and responsible for the execution of the project. MAE is responsible for territorial coordination and is the representative of the Government of Ecuador for the presentation of this project. This project is developed jointly between WFP and MAE based on four main issues identified by MAE for the updating of the national strategy.

- **Ministry of Agriculture, Livestock, Aquaculture and Fisheries (MAGAP)** is responsible the country's agricultural policies, including the management, regulation and training of agriculture, agro-forestry and agro-industrial sector. MAGAP will work and coordinate with MAE to align adaptation measures with the food sovereignty policy and the agriculture sector.

  MAGAP will coordinate and works together to MAE at two levels: a) Central, as part of the management team for the implementation of the project, and; b) Local, from their provincial units as part of the operational team coordinating sector specialists. Under MAGAP, the entities that will be involved in the project are: National Institute of Agricultural Research (INIAP), Secretary National of Water (SENAGUA), National

Institute of Irrigation (INAR), Forest Unit of Promotion and Development (PROFORESTAL), National Institute of Rural Training (INCCA). These entities have provincial units, which will facilitate the coordination and technical activities of the project team.

- **National Institute for Meteorology and Hydrology of Ecuador (INAMHI)** regulates the national hydro-meteorological sector. It has a key role in climate affairs in Ecuador, with a network of monitoring stations and overall supervision of official forecasting. It has the obligation to provide vital information on climate and water resources for the past, present and future. The director of INAMHI is the representative of Ecuador for the WMO (World Meteorological Society). In the national context, INAMHI is attached to SENAGUA, with technical staff and professional specialized in meteorology and hydrology, which contributes to the economic and social development of the country. This entity is working together with MAE in studies to define the impacts on climate change and the forecasting to 2080.

- **National Secretary Risk Management (SNGR**) governs and regulates the national system of risk management in Ecuador, in order to strengthen capacities of the country to face emergencies or disasters. The SNGR and WFP collaborate to strengthen technical capacity for disaster preparation. For this project, MAE and WFP will coordinate with SNGR to support activities related to knowledge and awareness about climate change issues.

  It is important to note that Ecuador took a pioneering step to incorporate risk management as a right on the new Constitution. Also in the Good Living National Plan, both risk management and climate change are mentioned. In this regard the integrated management to reduce risks and manage emergencies and disasters is recognized and promoted as state policy thus becomes a cross-cutting axis and a development variable. Risk management and climate change are interrelated since the first one identifies threats, assess vulnerabilities and determine the risks; the second (the adaptation to climate change) prepares people and ecosystems to the potential negative effects of climate change.

- Additionally, there are national institutions that are not directly involved in issues of risk management or adaptation to climate change. However, institutions like **SETECI** and **CODENPE**, have also been included as actors for their experience and possible contribution to the planning and participation project area. SETECI is responsible for the international cooperation management and belongs to the International Cooperation Ecuadorian System (SECI).

  It is a decentralized public entity, attached to SENPLADES. It coordinates the international cooperation between governments. In the other hand, CODENPE is projected as a technical institution that aim to establish a real and effective democratizacion process of the state, through a permanent and responsible communitary participation. It has developed an important job with communities, especially with those that have a majority of indigenous population. Althought, the coordination of activities with local governments has been difficult during last years.

- **Commonwealth of the basin of the River Jubones (MCRJ**) is formed by local, provincial and municipal governments in the provinces of Azuay, Loja and El Oro. This Commonwealth looks for the management of water resources to ensure this resource for

present and future generations. In 2009, MCRJ and WFP formed a strategic relationship to optimize the resources available for the recovery and protection of food security in the Commonwealth.

It is necessary to state that the Commonwealth of Jubones River Basin (MCRJ) is a voluntary and committed association of Autonomous Decentralized Governments (GAD) that worked in coordination with the stakeholders within the watershed to the integrated management of natural resources and human needs (social, economic, production) with particular emphasis on water resources, so that water and natural heritage is used and maintained by and for the present and future generations.

- **Provincial Government of Pichincha (GPP**) established programmatic priorities in the National Plan 2009-2014, including poverty reduction, food security and ensuring that families have access to food and improved quality of living through, inter alia, enhanced environmental quality. It also set goals related to integrated water management to ensure availability and universal access to water. Since 2001, the GPP has maintained a strategic relationship with WFP to address hunger and malnutrition. In this Alliance, the GPP has sought the cooperation of WFP to implement actions in the framework of its development plan.

- In the Rio Leon micro-watershed, Water User Boards will be a main implementing partner. These boards are already organized in the communities where the project will intervene. The strengthening of local organizations is part of the project strategy and will be facilitated in those counties that have a department or office devoted to environmental issues.

Project Team

The Government of Ecuador will execute this 5 year project with the support of WFP. MAE will be the executing institution responsible for ensuring that the objectives and components of the project are delivered effectively as outlined in the project document.

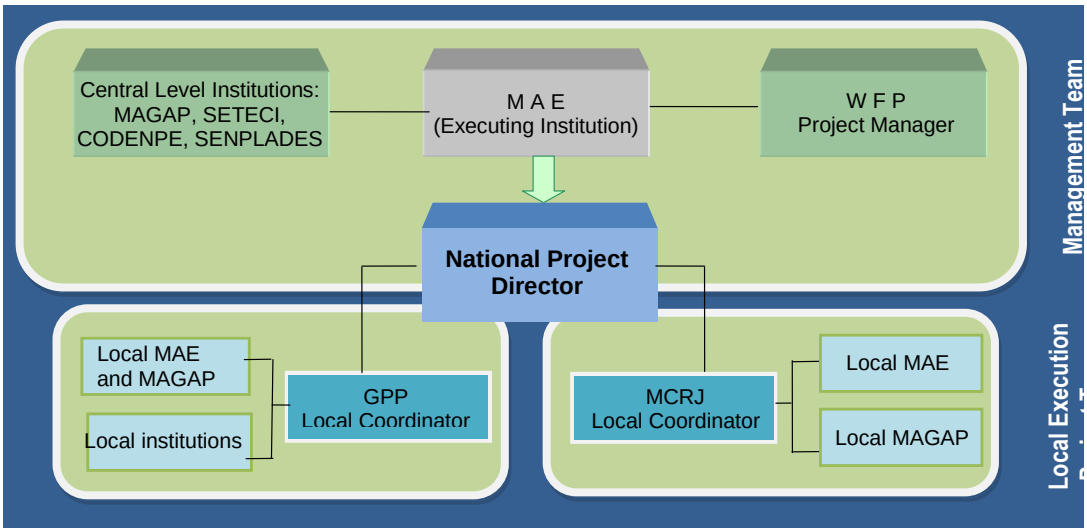
To ensure coordination within the project, a **Management Team** will be established, and lead by a **National Project Director** (NPD). This team will be composed of members from the central level, including MAE, MAGAP, WFP and the executing entities (GPP and MCRJ). MAE will define Letters of Agreement with MAGAP, GPP and MCRJ and designate the National Project Director. The NPD will be responsible for orienting the project and coordinating the actions of all actors at national and local level. The director will also be responsible for establishing and maintaining communications with all the relevant institutions in the water and agriculture sectors and with the planning arm of the government (SENPLADES). (See Graph 4)

Local implementation of the project will carried out by GPP and MCRJ, under the guidance of the management team. MAE and MAGAP will create **Local Executing Teams** to coordinate and provide technical inputs in support of project execution. Technical delegates of MAE and MAGAP will work in support of provincial divisions.

WFP will provide support to the NPD and management team, and assign a Project Manager (PM) to work with the NPD and management team. WFP will coordinate the processes of monitoring, evaluation and knowledge management with local operation teams designated

by MAE, MAGAP and the respective provinces. WFP will be responsible for developing the M&E plan and ensuring its implementation. WFP will assume financial oversight of the project and be accountable for the Adaptation Fund Board. WFP has all responsibility to ensure that the project achieves and measures expected results, and fulfills all reporting functions.

GRAPH 4
PROJECT TEAM STRUCTURE



B. Financial and Risk Management

Financial and project risk management measures will be assessed as an ongoing process throughout the project as described in Table 6.

TABLE 6
Risks and Responses

Risk		Response Measure
Changes in responsible actors in the Ecuadorian Government may determine possible changes in the national strategy for climate change.	Low	This risk is minimized as the project will ensure coordination among a number of actors, including national and local actors (MAGAP, GPP, MCRJ, MAE, SENAGUA and INAMHI).
Climate change adaptation has not been incorporated in policies, strategies, and plans of local governments.	Low	Although, since 1990 climate change was included in the political agenda, it is only in recent years that local governments have become involved in climate change issues. To institutionally strengthen all levels MAE created a Sub-secretary for climate change with a strong coordination role.

		Also, GPP has incorporated environmental issues in the Governance Plan, Strategic Plan and Territorial planning, and has requested WFP cooperation to address the effects of climate change. MCRJ was formed among local governments with the objective to work in a coordinated way with all actors to manage its natural resources.
MCRJ is going through a re-organization process to become a local governmental consortium. During this period of change the leadership may redirect its priorities towards different objectives.	Low	The project will be implemented with a number of local governments in the selected areas. This strategy will pressure authorities to implement the project. MCRJ and WFP have signed a letter of understanding and coordination.
Scientific and technical information in relation to climate change in Ecuador is insufficient and incomplete, and uncertain.	Medium	During the design process of the national strategy for climate change, MAE identified this risk as one of four key problems. Given that MAE recognizes this deficiency it is working to address key information gaps. Also, the project includes information generation, including adaptation and participation plans, and prompt alert systems.
There is little local specialized management and technical capacity related to climate change, particularly in the entities that are responsible for the project. MAE identified among one of the major problems regarding adaptation to climate change, the lack of human technical resources.	High	The risk is minimized as MAE has the overall leadership role for execution of the project. GPP and MCRJ will coordinate local actions with the local governments and organizations, as well, as with MAGAP and MAE. The project includes measures to strengthen institutional capacities.
Regulatory setting is in discussion by Ecuador National Assembly, including a. A new law that regulates the use of hydro resources.	Medium	This risk is minimized as MAE is the project executor and coordinates environmental policy and among different levels of government.
Weak local organizational structures, which may raise conflicts within and among local communities.	Low	Generally relations between local governments and communities are good. The GPP has experience in community level work and coordinates with the Community Development Department. MCRJ has actively worked in communities and MCRJ technicians have the necessary experience.
MAE has pointed out the lack of local level information on many aspects of climate change.	Medium	To minimize this risk it is necessary to create a strong awareness at community level regarding the threats of climate change. The project foresees the need to start with awareness activities and strengthen climate change knowledge, before implementation adaptation actions.

C. Monitoring and Evaluation Arrangements

Project monitoring and evaluation (M&E) will be in accordance with WFP procedures and will be carried out under the supervision of WFP. Monitoring and evaluation of project outcomes/results (both intermediate and end-of-project) will be coordinated by the PM. As well the KM system will be under the direction of WFP. WFP will assume financial oversight of the project and financial information on inputs, outputs, budgeting and accounting will be provided on a regular basis,

The following key M&E activities will be undertaken:

Project Inception Workshop (IW) will be held within the first 3 months of project start up with all stakeholders. The IW is crucial to building ownership for the project results and to plan the first year annual work plan.

Annual Progress Report: An Annual Progress Report (APR) shall be prepared by the Project Manager, and shared with all stakeholders. The APR will be include progress against set goals, objectives and targets, lessons learned, risk management and detailed financial disbursements.

Mid-term of the project cycle: The project will undergo an independent Mid-Term Evaluation (MTE) at the mid-point of project implementation (June 2013). The MTE will determine progress made toward the achievement of outcomes and will identify corrective actions if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. The findings of this review will be incorporated in a midterm report.

The M&E plan will be finalized, based on the Table 7 and the Results Framework in Table 8.

TABLE 7
M&E Plan

Type of M&E activity	**Responsible Parties**	**Budget US$*** *(does not include staff time)*	**Time frame**
Project Inception workshop (IW)	Project Coordinator WFP-CO	$3,800.00	Within first three months of project start up. (A meeting with each province: Pichincha, Azuay, Loja, El Oro)
Inception Report (workshop)	Project team WFP-CO	1,500.00	Immediately following IW
Quarterly reports	Project team	$ 30,000.00	At the end of each Quarter. (Visit to the communities to confirm progress for five years = 4x1,500x5)
Annual Progress Reports (APR)	Project Coordinator WFP-CO Project team	$ 7,500.00	At the end of each year (Requirement for year $ 1,500 x 5)
Meetings of the Project Coordination Committee	Project Coordinator WFP-CO	$2,400.00	After the inception workshop and thereafter at least once a year. (Meeting in two province 1.- Pichincha, 2.- Azuay, Loja, El Oro US$ 1,200 x 2)
Technical reports	Project team External consultants	None	To be determined by Project team and WFP-CO
Mid-term of the project cycle (MTE) external evaluation	Project team WFP-CO External consultants	$35,000.00	At the mid-point of project implementation
Final external evaluation	Project team WFP-CO External consultants	$ 45,000.00	At the end of project Implementation
Final Report	Project team WFP-CO	None	At least two month before the end of the project
Financial information Audit	WFP-CO Project team	$15,000.00	Yearly (average $ 3,000 per year)
TOTAL INDICATIVE COST		**$ 140,200.00**	

C. Results Framework

GOAL: *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 basin of the river Jubones.*

Objective 1: Increase knowledge to manage climate change risks affecting food security in targeted cantons in Pichincha Province and in the basin of river Jubones.

Objective 2: Strengthen adaptive capacity of highly food insecure communities to respond to the impacts of climate change, including variability in targeted cantons in the Pichincha Province and MCRJ.

Table 8
Results Framework

Project Strategy	Objectively Verifiable Indicators				
Goal	Reduce vulnerability and food insecurity of communities and ecosystems, related to the adverse effects of climate change, in the most vulnerable cantos of Pichincha Province and the Jubones River Basin.				
	Indicator	**Baseline**	**Target**	**Source of verification**	**Risks and assumptions**
Impact: To reduce food insecurity through effective adaptation to climate change measures	Threat level to ecosystems, related to climate change effects	Ecosystems rated as high vulnerability	By the end of the project the vulnerability level of ecosystems in the project area, are rated as medium	Ecosystem impact assessment at the end of the project Country Disaster Risk Management indicators	Climate change measures are long term and the project may not capture all change in ecosystem vulnerabilities Country policies do not support local adaptation with funds
	Household consumption score.	Food consumption less than 30 for 80% of population	Food consumption score improves (> 35/40) for all targeted participants	Social impact assessment at the end of the project Interviews with final participants	Climate change measures are long term and the project may not fully capture change in vulnerabilities and household food consumption within the next 5 years
Objective 1: Increased knowledge to manage climate change risks affecting food and nutrition security in targeted cantons in Pichincha Province and River Jubones basin.					
Outcome 1.1: Increased awareness of counties on climate change risks	Number of adaptation plans implemented at the community level, and incorporated in the district development plan	No community adaptation plans under development	50 parishes (39 parishes for the MCRJ and 11 for the GPP develop adaptation plans to climate change risk, in a participatory process	Community focus groups Workshops findings Adaptation plans include food security and gender approaches	Community structures need to be strengthened
Output 1.1.1: Parishes in targeted	Number of targeted	Limited knowledge by	By the end of the project	Interviews and	The disseminated information within the

cantons trained in climate change threats and adaptation measures which reduce vulnerability, in particular related to food security	population aware of climate change impacts and appropriate responses to threats	vulnerable parishes in the adaptation measures to reduce food insecurity	at least one family member out of 15,000 households have knowledge of climate threats and adaptation measures	surveys with community beneficiaries, related with monitoring and follow-up processes of the project implementation	parishes is not internalized well
Output 1.1.2: Targeted parishes participate in adaptation and risk reduction awareness activities	Awareness raised at community level of climate change threats	Limited awareness by parishes of climate threats and local responses	By the end of the project two 4 year awareness campaigns (one for the MCRJ and one for GPP) have been established and implemented	Surveys and interviews, related with monitoring and follow-up processes of the project implementation Field trips	There is low communitarian support to implement the disseminated activities
Output 1.1.3: Food security and gender considerations integrated in all adaptation training programs	Food security training plan integrated within the adaptation training programs, with gender considerations.	Neither adaptation plans has integrated food security component, nor any development plans	By the end of the project all the developed adaptation plans, include a food security training plan. At least 40% of the participants in the training programs are women	Food security training programs. List of participants to the training programs	There is low community participation on the trainings.
Outcome 1.2: Secured ownership of adaptation measures in parishes in targeted cantons.	Number of planning frameworks at provincial and canton level include change adaptation considerations	Each of the targeted cantons has a development plan, that includes environmental issues, but it does not include adaptation measures	By the end of the project all the targeted cantons and provinces have incorporated climate change variability and adaptation considerations	District development plans	The process to include adaptation measures inthe planning frameworks at the canton development plans, takes longer than planned
	Number of parishes with adaptation plans aligned with local and provincial priorities	Each district by law must have a development plan developed by March 2011. These plans	By the end of the project 50 parishes have developed their adaptation plans, aligned with local and provincial	Community adaptation plan Interviews with decision makers at	The process to include adaptation measures into the planning frameworks at the canton development plans, takes longer than planned

		include environmental issues	priorities, are used as a decision making tool	local level, related with monitoring and follow-up processes of the project implementation Final project evaluation	
	Number of adaptation plans, developed with community participation.	There are no climate change adaptation plans developed with active community participation	By the end of the project 50 parishes have participated in the adaptation plan development, with 50% of women in parishes participating	Surveys with the community leaders and women beneficiaries	Community leaders do not promote full participation of the community
Output 1.2.1: Canton and community adaptation plans developed to reduce vulnerabilities to climate change induced food insecurity in targeted areas	Number of adaptation plans with a vulnerability reduction and food security approach	There are no adaptation plans for targeted cantons and parishes with this focus	By the end of the project all targeted canton and community adaptation plans incorporate vulnerability reduction and food security solutions	Adaptation plans	Some of the technically required climate change adaptation measures are not community priorities
Output 1.2.2: Community participation in processes to develop adaptation plans in targeted cantons	Number of parishes and community leaders that participate in the process to develop adaptation plans	There are no adaptation plans developed with community participation.	By the end of the project, 50 parishes, including leaders and citizens have actively participated in the adaptation plans development	List of participants Interviews with community leaders	Communities have other priorities and face constraints to participate
Output 1.2.3: Agreements developed and signed among targeted cantons, GPP or MCRJ, MAE and WFP to implement adaptation actions	Number of institutions with increased capacity to manage adverse climate change events	No agreements in the targeted project area.	50 parishes sign agreements with required stakeholders	MOUs	
Output 1.2.4:	Number of women that	Limited participation	Women involved in	Focal groups.	Measures to overcome cultural barriers

Women participated in processes and decision making to develop adaptation plans.	are community leaders with an actively participation in adaptation plans development, and decision making processes.	of women and limited decision making roles	decision making in all parishes	Interviews with decision makers at local level, related with monitoring and follow-up processes of the project implementation	are not effective
Outcome 1.3: Increased knowledge to manage climate change and risk, including climate variability affecting food security and nutrition.	Disaster preparedness score.	Limited disaster preparedness knowledge in local governments of targeted parishes	Disaster preparedness score equal to or greater than 7, indicating local government capacity in disaster preparedness ad food security information with WFP support	Focus group discussions. Survey data. Final project evaluation.	Local governments have not enough technical capacity to manage climate change risks
	Percentage of early warning systems that meet national meteorological standards that are used on place	No early warning systems to cope with main disasters on place.	By the end of the project 50 systems in place and parishes able to take appropriate response actions following protocols	Surveys with the communities Site visits during the project implementation Final project evaluation	No technical community capacity to implement early warning systems tools and protocols
Output 1.3.1: Community early warning system designed, implemented and maintained	Number of vulnerable cantons with a designed early warning system and protocols	No early warning systems to cope with main disasters on place	By the end of the project 50 parishes have designed their early warning systems and protocols	Early warning systems Site visits during the project implementation	No technical capacity at the local level to participate in the systems development
Output 1.3.2: Monitoring system in place to track climate events in targeted cantons	A basic community based system for risk monitoring	No community monitoring system on place	By the end of the project 30 parishes have a monitoring system to track climate events	Community decision making tools for climate change Focal groups Interviews with	There is no strong community organization to implement and support the system

				decision makers at local level, related with monitoring and follow-up processes of the project implementation.	
Output 1.3.3: Monitoring system to track project results and lessons learned	A project results and lessons learned monitoring system	No monitoring system	By the first six months of the project implementation, a monitoring system is designed and implemented Document with project lesson learned and validated models to be replicated.	Monitoring reports of project implementation twice a year	Stakeholder staff at local level require training to undertaken monitoring roles
Objective 2: Strengthen adaptive capacity of highly food insecure communities to respond to the impacts of climate change, including variability in targeted cantons in Pichincha Province and MCRJ.					
Outcome 2.1: Increased adaptive capacity and ecosystem resilience in targeted rural parishes	Community adaptation asset score (natural and physical)	No adaptative capacity is implemented in the targeted rural parishes	By the end of the project 50 parishes have reduced their risk and implemented adaptation measures Asset score threshold set to capture increase (created or restored) in community adaptation assets over base level communities	Focus group discussions Survey data Final project evaluation	No technical capacity in the communities to implement the proposed activities MCRJ is going through a re-organization process to become a local governmental consortium. During this period of change the leadership team may redirect its priorities towards different objectives of those established in the project, especially for the selected focal zones
	Percentage of households in targeted parishes with increased capacity to manage climate risk desegregated by	Initial survey of targeted households	By the end of the project at least one member of each targeted household has received training and increased their understanding of climate	List of participants to the training programs. Focal groups and interviews	There is low community participation in the trainings

	gender		risk and management 50% of the household participants are women		
Output 2.1.1: Concrete adaptation measures based on community adaptation plans are designed	Number of parishes that have implemented concrete adaptation measures	No community activities implemented in the targeted rural parishes	By the end of the project 50 parishes have implemented at least 3 concrete adaptation measures	Survey data Field visits Mid term and final project evaluations	There are limited economic and human resources to implement the activities in the parishes
Output 2.1.2: Physical assets created, improved or maintained	Physical assets implemented	Limited number of physical assets in place	Assets created according to community plans	Field visit Surveys	Community workforce available to support engineering measures
Output 2.1.3: Natural resources assets created, improved or maintained	Natural resources assets implemented	Limited number of natural assets in place to withstand or adapt to climate change events	Activities implemented according to community plans	Field visit Surveys	Community workforce available to support natural resources measures
Output 2.1.4: Identification of adaptation technology requirements	Number of technological instruments to address climate threats identified	No technologies related to adaptation to climate change in place	By the end of the project the GPP and the MCRJ have identified the adaptation technologies needed to address climate change on each of the targeted parishes	Interviews with local project coordinators and stakeholder staff	The costs to implement the identified technologies are too high
Output 2.1.5: Implementation strategy includes approach for the use of incentives	Number of parishes that receive incentives to implement physical/natural resources assets	Payment for ecosystem services has not been implemented before in the targeted project area	To be determined according to community plans	Focal groups Surveys Lists of beneficiaries receiving payments by gender and community Lists of beneficiaries exchanging vouchers in shops, by gender, shop and community	Payments received by households does not support livelihoods
Outcome 2.2: Increased capacity at	Coordination mechanisms among	Limited coordination among the main	By the end of the project there is a letter of	Letter of interest.	Some of the involved parties do not have political interest to sign the letters

parishes and institutional level to manage climate change risk in the targeted cantons	parishes, local governments, provincial governments in place	involved institutions to implement the adaptation measures	interest among all the involved entities to manage jointly climate change risks in the targeted cantons		
	Percentage of local governments and key stakeholders at national, provincial and local level that access to climate change relevant information	Climate change and variability information is insufficient and not up-dated Access is limited	Project stakeholders are able to access to up-dated information	Documents, resorts, evaluations, technologies	The information is not documented Scientific and technical information availability in relation to climate change in Ecuador is insufficient and incomplete
Output 2.2.1: Community participation, in particular of women, guide decision making processes for project execution	Parishes agree and support with decisions taken	Limited community participation on decision making processes	All of the proposed activities in the project have a participatory implementation strategy 50% of the participants are women.	Meetings records Interviews and surveys with parishes' leaders List of participants	Not enough time is given to nurturing the participatory process
Output 2.2.2: Parishes share success stories and lessons learned	Number of workshops to disseminate de information	No documented information available	Each of the targeted parishes has by the end of the project documented their experience	Documents, reports, evaluations referring the project	Most relevant information is not documented by stakeholders staff
	Number of visits to other parishes, not targeted in this project, to disseminate the information	No visits have been carried out	The most successful experiences, as well as the worst ones are documented	Documents, reports, evaluations pertaining to the project	Relevant information is not documented

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

A. RECORD OF ENDORSEMENT ON BEHALF OF THE GOVERNMENT

Dr. Marcela Aguiñaga Vallejo, Minister, Ministry of Environment (MAE)

Dr. Marcela Aguiñaga Vallejo *Minister of Environment*	Date: *(15th January, 2011)*

A. IMPLEMENTING ENTITY CERTIFICATION

Measures for financial and program/project risk management and for monitoring, reporting and evaluation will be detailed in the full program document.

I certify that this proposal has been prepared in accordance with guidelines provided by Adaptation Fund Board, and prevailing National Development Plan, National Environment Policy and National Climate Change Strategy subject to the approval by the Adaptation Fund Board, understand that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project.

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