



PROJECT/PROGRAMME PROPOSAL

PART I: PROJECT/PROGRAMME INFORMATION

PROJECT/PROGRAMME CATEGORY:	Regular
COUNTRY/IES:	El Salvador
TITLE OF PROJECT/PROGRAMME:	Promoting climate change resilient infrastructure development in San Salvador Metropolitan Area (PIMS 4585)
TYPE OF IMPLEMENTING ENTITY:	Multilateral Implementing Entity
IMPLEMENTING ENTITY:	United Nations Development Programme
EXECUTING ENTITY/IES:	Ministry of Public Works, Transport, Housing and Urban Development (MOP)
AMOUNT OF FINANCING REQUESTED:	US\$5,425,000

PROJECT / PROGRAMME BACKGROUND AND CONTEXT:

El Salvador is highlighted by a number of international organizations as one of the most vulnerable countries to climate related disasters in Latin America (GFDRR 2009, UNDAC and OCHA 2010). The country is particularly sensitive to the negative impacts of climate change due to its geographical location and the extent of its social, economic, and environmental problems. El Salvador is exposed to a growing number of hurricanes and tropical storms from the Pacific as well as the Atlantic oceans. Decades of poverty, social marginalization, lack of opportunities for democracy, and environmental deterioration led the country to a civil war in 1979. Since the end of the war in 1992, El Salvador has sought to create new paths for growth, but the extent of socioeconomic and environmental problems have formed obstacles to build structural changes in the society. The current administration is the first alternation of power in the modern democratic history of El Salvador. This administration is seeking to build sustainable paths of growth, improve social well-being, economic growth and the protection of the environment.

The national government of El Salvador has begun to recognize the importance of considering climate change not only as a major environmental problem but also a key development challenge. The 5-Year Development Plan 2010-2014 incorporates responses to climate change (mitigation and adaptation) as part of its objectives. This Plan creates an initial framework for strategies that define specific actions to reduce the vulnerability of the territory to the negative impacts of climate change and build resilience in the short and long-term.

Climatic hazards

Damages caused by tropical storms and hurricanes during the last decade in the Central American region have raised attention to the close relationship between adapting to climate change and development. Data from national studies and international organizations reveal a high social and urban vulnerability to climate related hazards. Historical data from the Center for the Epidemiology of Natural Hazards in Louvain, Belgium (CRED 2009) and the UN Economic Center for Latin America (ECLAC 2009), shows that natural hazards have caused 6,500 casualties between 1972 and 2009 in El Salvador. The economic cost of those hazards was close to \$16 billion dollars during this period. 87 percent of the natural hazards, 68 percent of all economic losses, and 62 percent of all fatalities were caused by climatic events. However, events occurring during the last decade represent 53 percent of all natural hazards of the last 100 years in El Salvador, and 76 percent of them are climate related hazards.

The combination of a tropical depression and Hurricane IDA in November 2009 has recently illustrated the very high exposure of El Salvador to climatic events. Extreme precipitation has reached a peak of 355 mm in five hours on November 8th. This event has caused severe flooding and landslides in several parts of the country including the capital city of San Salvador. Historical records show that the higher number of casualties associated with climatic events occurs every 10 to 30 years. The Post Disaster Needs Assessment (PDNA) estimated that hurricane IDA affected 122,000 people and caused over US\$239 million of damages and losses in El Salvador. Damages in San Salvador were estimated at US\$54,6 million directly affecting 6200 households and indirectly affecting 24,000 people in the metropolitan area (particularly the municipalities of San Martin and Ilopango) (Direccion de Proteccion Civil 2010).

In May and June 2010, the country was again impacted by tropical storms Agatha and Alex. Although the total precipitation recorded in six days was higher during Hurricane Mitch in 1998 (737 mm) and Hurricane Stan in 2005 (765 mm), Agatha's accumulated precipitation was near those peaks (678 mm). Nonetheless, data from the Ministry of the Environment and Natural Resources (MARN) shows that Agatha had the highest concentration of precipitation in 24 hours compared to other climatic events of the last century (483 mm during Agatha in 2010, 375 mm during Mitch in 1998, 355 mm during IDA in 2009, and 299 mm during Stan in 2005) (Direccion de Proteccion Civil 2010). Agatha's precipitation period of return for the peak six hours was higher than 300 years. Hurricane IDA, just a few months earlier, had a similar period of return of 300 years for peak precipitation in six hours (Direccion de Proteccion Civil 2010). Tropical storm Alex hit El Salvador only a few weeks later. Precipitation levels were 163 mm in 24 hours causing also flooding problems in San Salvador. Annual mean precipitation is 1668 mm in San Salvador.

Damages caused by Agatha in the metropolitan area of San Salvador included flooding and landslides which required the evacuation of inhabitants in several parts of the city.

Agatha also caused damages to the drinking water system (damage to pipes, pumping stations and a water treatment plant) affecting water supply in several parts of the metropolitan area.

The economic cost of Agatha was estimated to be US\$112 million in El Salvador. A significant portion of that cost was related to the metropolitan area of San Salvador.

Social and Urban Vulnerability to flooding and erosion in San Salvador

Climate related hazards have become more frequent as rapid urban growth has modified the landscape in San Salvador. Urban growth, driven by low and high income groups, has given little consideration to the flow and control of stormwater within urban areas. Public authorities have not been able to orient the rapid process of urbanization protecting key physiographic conditions of the landscape allowing the flow of runoff during extreme climatic events. There is no complete hydrological model for the metropolitan area of San Salvador. Deficiencies in planning urban growth and its incomplete enforcement have resulted in the reduction, modification, or blocked water flow in the rivers and ravines used as primary drains for storm water. The path of urbanization in San Salvador has created urban and social vulnerability to climatic events, which is being exacerbated by climate change.

A recent study on flooding hazards in San Salvador considers that precipitations of 35 mm per hour can have yearly recurrences (Fernandez-Lavado 2010). Other studies report flooding, erosion and landslides in several parts of the metropolitan area with precipitation higher than 50 mm per hour (SNET 2003). Using data from the meteorological station in San Salvador and its surrounding area, Fernandez- Lavado (2010) estimate that there is 50% chance that events with precipitation of 90 mm in 24 hours occur every year.

Data from the last population census indicated the metropolitan area of San Salvador had 1,566,629 inhabitants (OPAMSS 2007). 10.4% of them live in extreme poverty and they are located in hazardous areas along the ravines and rivers that run through the metropolitan area (Mapa de Pobreza Urbana y Exclusion Social 2010). However, exposure of flooding, erosion, and landslides extends to larger areas of San Salvador and a large part of the population, due to the lack of control of urbanization and constant modification of the landscape.

The rivers and ravines in San Salvador are used as primary drains for storm water but are also used as drains for part of the industrial and domestic waste water (only 10% of waste water is treated) (Tucci 2006). The rivers and ravines are also used to dump solid waste by part of the population obstructing progressively their capacity to drain storm water. The construction of dwellings along the rivers and ravines by low-income groups or the construction of infrastructure also modifies and reduce the capacity of the natural drains to conduct storm water. Soil is fragile and easily eroded by water in the borders of the rivers and ravines. Dwellings in those areas have collapsed obstructing further the free flow of water in those drains. Furthermore, urbanizations in the upper part of the basins have increased the volume of runoff flooding in the lower parts of the metropolitan area. Vegetated areas in the upper sub-basins can infiltrate the first 70 to 100 mm of

precipitation without causing any runoff, however the deforestation of these areas by urbanization cause runoff after the first 5 mm of precipitation (Bolund and Hunhammar 1999, Pauleit and Duhme 2000, Viceministerio de Vivienda y Desarrollo Urbano 2008).

An additional problem is the lack of maintenance in the primary and secondary drains of the storm water system in San Salvador causing the accumulation of water in different parts of the urban area and the reduction of the capacity of the system to flow storm water.

Several studies analyzing flooding and erosion problems in San Salvador have a similar conclusion: flood control in the lower parts of the basin requires reducing the flow of storm water in the upper parts of the metropolitan area (SNET 2003, Bertoni 2005, Corraera Consultores Asociados 2008, Rubio et al. 2008, Direccion de Proteccion Civil 2010, Fernandez-Lavado 2010) These studies notes that the current efforts to build flood controls in the lower parts of the city will not have enough capacity to control the amount of runoff generated in the upper parts of the metropolitan area. This situation will be exacerbated in the future under the projected climate change scenarios. The recent climatic events described above illustrate the exposure to extreme precipitation in the metropolitan area.

The Second National Communication of El Salvador forecasts an increase in precipitation at the end of the rainy season, aggravating flooding and erosion problems. It also suggests a potential decrease in the availability of water during the dry season, aggravating the pressure on water sources in the metropolitan area.

The most vulnerable groups to flooding and erosion caused by runoff and water stress in San Salvador are low-income neighborhoods in the lower parts of the metropolitan area. However, reducing their vulnerability to flooding and ensuring their adaptation to climate change cannot be achieved only through direct local actions in their communities. It requires integrated actions in the upper basins to diminish the amount of runoff in the metropolitan storm water system. Flooding problems in these communities will increase during the next decades if actions are not taken in the upper part of the basins.

A larger number of communities will become vulnerable to flooding if adaptation actions are not implemented in the short-term. An important component of the climate change related vulnerability of these communities is their limited socioeconomic capacity to relocate to safe areas. The metropolitan authorities and the national government do not have enough resources to provide adequate and safe housing for the large number of inhabitants located in flood-prone areas. An additional problem is the reluctance of many of those inhabitants to relocate to other parts of the metropolitan area or even to evacuate their houses in case of an emergency. The rapid expansion of informal settlements in risk-prone areas in San Salvador has created a large number of groups vulnerable to flooding caused by climate variability. This situation is expected to be aggravated under climate change scenarios and requires rapid adaptive measures.

The Government of El Salvador seeks to enhance the country preparedness to climatic events within the framework of sustainable development. The United Nations Development Programme (UNDP) and other international organizations are assisting the country in this effort, and initial interventions have raised the awareness on the necessity of

adapting to climate change. The President, Mauricio Funes, has recently highlighted the need of mainstreaming climate change adaptation as a key element of public policies.

The Ministry of Public Works, Transport, Housing and Urban Development (MOP) and the Ministry of the Environment and Natural Resources (MARN) have taken a leading role incorporating climate change adaptation as a major concern in their agenda. The MOP has recently created a new division focusing on risk management and climate change adaptation, particularly associated to extreme climatic events. This division will open 40 new professional positions oriented to develop new approaches for risk management in the country and climate proofing infrastructure.

This ministry is also taking a dynamic role in the Central American region, promoting integration as part of the solution for disaster risk management and climate change adaptation. This Ministry is encouraging neighbor countries to coordinate regional regulations and standards for the construction of infrastructure that will incorporate climate change adaptation considerations.

With the support of the Adaptation Fund, El Salvador could become an example of the role national governments can play in preparing societies to face the potential impacts of climate change. The collaboration between the MOP and the MARN in this project will facilitate the development of an integrated coordination within the national government. This is strongly needed to build climate change resilience and create opportunities for sustainable development. The relationship between the public institutions managing the environment and those dedicated to public works is often characterized by conflict rather than by collaboration. The partnership fostered by this project has been developed with the political support and commitment from the two ministries. The objective of this partnership is to illustrate the necessity of building resilience and adapting to climate change in the country and reduce the vulnerability of the Metropolitan Area of San Salvador to flooding and water stress intensified by the impacts of climate change. The project will also demonstrate the benefits of crosscutting collaboration within the public sector, between the national and municipal governments, and among the public, social, and private sectors.

The Government of El Salvador considers the need to build responses to climate change as part of its national development plan. The 5-Year Development Plan 2010-2014 incorporates a series of goals and actions fostering responses to climate change. Like in many other countries, these goals have been developed by isolated sectors but with few opportunities to build synergies among them.

This Project creates the opportunity to develop tangible results in climate change adaptation in San Salvador Metropolitan Area. It focuses on two chronic problems that are being exacerbated by climate change: flooding and erosion associated with high intensity precipitation and securing drinking water for the metropolitan area.

■ PROJECT / PROGRAMME OBJECTIVES:

The main objective of the project is to reduce the vulnerability of urban areas to flooding, erosion, and landslides created by extreme precipitation associated with climate variability and climate change. This will be achieved by the development of resilient infrastructure that can resist and mitigate the impacts of extreme events. The water infrastructure system is not capable of handling the extreme rainfall events expected under even the most benign climate change scenarios. Current interventions to address water flow are focused on downstream measures designed to prevent major erosion or flooding. Increasingly, however, such measures are becoming highly expensive and mostly ineffective, as they can hardly cope with one or two major events. A broader approach to water management that also addresses upstream measures is necessary to reduce peak flows and the stress on current drainage infrastructure. The resilient infrastructure development approach proposed considers decentralized solutions, which focus on managing flooding and erosion risks in the lower basin through infrastructure interventions in the upper basin. Such investments can be smaller and more cost effective, since they will protect existing downstream drainage and constructions (such as housing, roads, bridges, etc).

As a result of the execution of alternative decentralized rainfall management solutions the project will also improve water management and diminish pressure on water resources. The projects will catalyze new paths of growth in San Salvador Metropolitan Area and other urban communities in the country, reducing their vulnerability and enhancing their resilience to the negative impacts of climate change. The specific components of the project are summarized in the following table and described in detail in the project description sections below.

3.4 Infrastructure and urban planning Climate change adaptation considerations integrated in engineers and architects considerations incorporated in engineers and architects academic curricula in national universities.	
Project/Programme Execution Cost	4,910,000
Project/Programme Preparation Cost	4,910,000
Project Cycle Management Cost charged by the Implementing Entity (if applicable)	5,425,000
Amount of Financial Resources charged by the Implementing Entity (if applicable)	4,545,000
Amount of Financing Requested	5,425,000

PROJECT / PROGRAMME COMPONENTS AND FINANCING:

PROJECT COMPONENTS	EXPECTED CONCRETE OUTPUTS	EXPECTED OUTCOMES	AMOUNT (US\$)
1. Infrastructure Climate Proofing in San Salvador Metropolitan Area	<p>1.1 An integrated analysis of vulnerability to flooding of San Salvador Metropolitan Area. (AF investment: US\$150,000)</p> <p>1.2 Cost benefit and technical feasibility study to define cost effective upstream measures to reduce runoff. (AF investment: US\$200,000)</p> <p>1.3 Resilient infrastructure measures implemented to reduce flooding and water stress vulnerability in two communities of San Salvador Metropolitan Area (La Cruz and La Bretaña) (AF investment: US\$3,250,000)</p>	1.1 Reduced run off in selected vulnerable area of San Salvador Metropolitan Area through the implementation of alternative upstream water management practices.	3,600,000
2. Institutional Strengthening	<p>2.1 Policy guidelines to improve climate resilient human settlements planning developed. (AF investment: US\$150,000)</p> <p>2.2 Revised and improved building codes and planning standards for public infrastructure. (AF investment: US\$300,000)</p> <p>2.3 Technical and economic tools developed for the design of climate proofed infrastructure. (AF investment: US\$150,000)</p> <p>2.4 Established coordination mechanism among public institutions and between the public sector and other stakeholders. (AF investment: US\$100,000)</p>	2.1 Increased capacity of public sector to prevent likely and uncertain Climate Change risks on infrastructure	700,000
3. Knowledge Management & Communication	<p>3.1 Lesson learnt from the successes, obstacles and opportunities encountered through the implementation of the Project disseminated to local governments and stakeholders. (AF investment: US\$50,000)</p> <p>3.2 Implemented Communication</p>	3.1 Increased knowledge for building resilient community to climate change amongst stakeholders.	600,000

	<p>campaign to increase knowledge and ownership by the communities of public climate resilient infrastructure (AF investment: US\$250,000).</p> <p>3.3 Disseminated designed tools and revised building codes & planning guidelines (AF investment: US\$50,000)</p> <p>3.4 Infrastructure and urban planning climate change adaptation considerations incorporated in engineers and architects academic curricula in national universities. (AF investment: US\$250,000)</p>		
4. Project/Programme Execution Cost			4,900,000
5. Monitoring & Evaluation			100,000
6. Total Project/Programme Cost			5,000,000
6. Project Cycle Management Fee charged by the Implementing Entity (if applicable) ¹			425,000
Amount of Financing Requested			5,425,000

¹ On the request of the Government of El Salvador, the project will be implemented by UNDP using the MIE modality. UNDP is able to provide the following implementation services through its country office, regional and headquarters networks: project identification, formulation, and appraisal; determination of execution modality and local capacity assessment of the national executing entity; briefing and de-briefing of project staff; oversight and monitoring of AF funds, including participation in project reviews; receipt, allocation and reporting to the AF Board of financial resources; thematic and technical capacity building and backstopping; support with knowledge transfer; policy advisory services; technical and quality assurance; and troubleshooting assistance to the national project staff. Further details on the types of specialized technical support services which may be provided are articulated in the table provided to the AFB Secretariat on 14 May 2010 (as annexed).

■ **PROJECTED CALENDAR:**

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

MILESTONES	EXPECTED DATES
Start of Project/Programme Implementation	July 2011
Mid-term Review (if planned)	July 2013
Project/Programme Closing	July 2015
Terminal Evaluation	September 2015

■ **PART II: PROJECT / PROGRAMME JUSTIFICATION**

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

The project is designed to strengthen the resilience of San Salvador Metropolitan Area to extreme precipitation events, expected in climate change scenarios through the use of resilient infrastructure. It has four complementary components.

Component one: Infrastructure Climate Proofing in San Salvador Metropolitan Area

The first component of the project sets in place an integrated infrastructure framework to reduce peak water flow and prevent flooding, erosion and other damages. It establishes an integrated perspective of the metropolitan storm water system and identifies alternatives to reduce and delay runoff flowing to the lower parts of the basins. This will reduce flooding problems in San Salvador Metropolitan Area, caused by the saturation of primary and secondary drains of the municipal storm water system during periods of intense precipitation. It also identifies, analyzes and quantifies the collection and storage capacity of storm water within the urban area.

The project explores diverse collection and storage alternatives that can be adjusted to the socio-demographic and urban conditions of different parts of the city.

Output 1.1 is an integrated analysis of vulnerability to precipitations (in particular flooding and erosion) of San Salvador Metropolitan Area. This study will consider the vulnerability resulting from the combined exposure to an extreme event (rainfall in this case), the sensitivity of the system to suffer damage through that exposure, and the adaptive capacity of the inhabitants to reduce the negative consequences of that exposure (Adger 2006, IPCC 2007). The metropolitan area has grown rapidly during the last decades and the urbanization process has modified the landscape and the flow of runoff in the basins. Some international initiatives have studied flooding problems in selected isolated basins; however they have not considered the impact of climate change on the current situation.

As a first step of this analysis, a complete hydrological study of San Salvador Metropolitan Area will be developed, incorporating climate change scenarios. This will allow defining the areas where the retention and capture of runoff water can be more effective to reduce the overflow of primary and secondary drains in the municipal storm water system.

The vulnerability analysis will be drawn on the results of the hydrological study, the scenarios of the Second National Communication on Climate Change for the prevision of future precipitation, the results of the study on Urban Poverty and Social Exclusion in El Salvador (UNDP and FLACSO 2010) and other studies documenting climate related hazards (SNET 2003, Bertoni 2005, Carrera Consultores Asociados 2008, Rubio et al. 2008, Dirección de Protección Civil 2010, Fernandez-Lavado 2010). It will also incorporate data from the last national census and from the Metropolitan Urban Planning Agency (OPAMSS). Part of the study will consist of semi-structured interviews with inhabitants in flood-prone areas to seek a better understanding of their perceptions of hazards they are exposed to, their assets to cope with extreme events, and their strategies and alternatives of action in case of an emergency.

The results of this study will assist local and national authorities and stakeholders in identifying social groups and areas of the city where investment in resilient infrastructure can be more effective for climate change adaptation (who should adapt to what? and where?). These results will also support vulnerable groups to incorporate a short and long-term integrated perspective of the hazards they are exposed to and the type of alternatives they have to reduce their vulnerability and build resilience. This study is a much needed tool that links climate change adaptation and urban planning in San Salvador Metropolitan Area. It will assist decision makers in defining areas where resilient infrastructure interventions, both in the upper basin and lower basin, can reduce the vulnerability of the population, or where risks are too high for human settlements.

Output 1.2 Based on the conclusions of Output 1.1 a cost benefit and technical feasibility study to define cost effective upstream measures to reduce runoff will be developed. This study will evaluate a range of decentralized infrastructure solutions that can be applied in the upper basin of San Salvador Metropolitan Area to prevent flooding, erosion and other damages in the lower basin. Initial expert assessments consider that the most cost effective solutions are interventions in the upper basin; hence the project will focus its investment interventions in such areas. The potential for rainwater harvesting will be evaluated and alternatives for storage and use analyzed. By using remote sensing and GIS the project will identify, analyze and quantify the areas for the capture of precipitation and runoff. It will also consider different water storage solutions, principally, to facilitate the use of water for urban functions, including several uses within the households and the provision of potable water, and to delay the time in which runoff reaches the municipal storm water system. Several alternatives will be explored for the capture, retention, and storage of water. Among others, one option is the use of green roofs, including the implementation of the respective incentives needed for their construction and maintenance. The Project will also document the potential use of large commercial and industrial buildings to collect rainfall on their roofs to reduce and delay the flow of water to secondary and primary drains. These alternatives have been used, or are planned to be used, by a number of urban areas in high, middle, and low-income countries as part of their climate change adaptation plans.

This study will ensure the cost effectiveness and the technical feasibility of the measures that will be implemented in the investments considered in output 1.3.

Output 1.3 is the largest investment module of the Project and serves to implement measures to strengthen the resilience of infrastructure to climate induced flooding and water stress. Based on previous assessments and expert judgment, these concrete measures are expected to reduce vulnerability and build resilience in two communities of San Salvador Metropolitan Area. The project will build on national and local development initiatives in these two communities by incorporating appropriate measures to strengthen resilience to climate change into the ongoing baseline development programme. These initiatives are part of the national and municipal responses to meet housing demands in low-income social groups. The value of the AF project is not only to build climate change resilience in the selected communities, but to create the necessary precedent to foster and catalyze similar initiatives in other parts of the city, in other urban areas of El Salvador, and in neighboring countries in the region (Central America).

The first intervention will be in the low-income housing development project of La Bretaña, located in the Municipality of San Martin. Although it is part of the San Salvador Metropolitan Area, the Municipality of San Martin's location in the southeast separates it geographically from the rest of the city. Consequently, it does not share a watershed with most of the city and is not connected to the metropolitan drinking water system. San Martin has a population of approximately 72,000 inhabitants, mostly low income working class.

La Bretaña is a new housing complex located in San Martin. It is the largest public housing project in El Salvador and is considered emblematic of the efforts made by the current administration to meet housing demand. The project is being developed by the National Popular Housing Fund (FONAVIPO) and will provide housing for approximately 10,000 people in 1,875 households. Construction of La Bretaña is expected to begin in early 2011. The current design of the storm water system for La Bretaña uses a traditional approach of primary and secondary collectors designed for an event return period of 35 years. A recommended period of return of 50 years was not adopted due to the increased cost and size of the required infrastructure. To supply water access to the new housing complex, the current design is proposing the drilling of new wells. If constructed as currently designed, this project is likely to be vulnerable to extreme rainfall events expected even in the most benign climate change scenarios for El Salvador. Furthermore, it will have strong impacts on the Municipality of San Martin, substantially augmenting peak water flows and increasing the likelihood of flooding and heavy damage to existing infrastructure.

The AF initiative will incorporate climate resilient infrastructure measures in La Bretaña to ensure that the project is constructed with a sound water management system that is cost effective and can cope with climate induced water stress over the lifetime of the investment. In addition to strengthening the resilience of the housing project itself, the implemented measures will diminish the pressure on the existing infrastructure in the Municipality of San Martin. The project will therefore benefit the entire community, reducing its vulnerability to flooding and expanding its sources of drinking water.

Precipitation during recent storms has reached levels similar to those for a 50 year return period, so a system designed to cope with at least this amount of rainfall is necessary for the Bretaña project. This does not necessarily require the implementation of the initially recommended larger traditional drainage system. A water management system that incorporates decentralized water collection and runoff retention and storage measures is preferable, since it will be more resilient and cost effective, and will reduce the additional stress on existing infrastructure in San Martin.

An initial conceptual design, to be further assessed and refined during the project (feasibility and cost effectiveness analyses described above, Output 1.2), proposes a system of three stages to capture and delay the flow of rainwater to the secondary and primary drains. The first step is to capture rainwater in each dwelling. While there are many means to do this, a preferred option is the installation of green roofs that will enhance the capture of rainfall. As an additional benefit green roofs will also reduce the exposure to solar radiation and improve the energy coefficient of the dwellings. Additionally, water filters and water storage facilities will be installed in the lower part of the dwellings in order to recycle rainwater. This water will be use for not-drinking purposes.

When the storage capacity of this first step reaches its limit, water will flow to a second retention system. This system will be made of a series of open spaces normally used as playing grounds for children and social areas (during the dry season). These areas are designed to allow progressive flooding in order to facilitate its partial use, even when they operate, to delay the flow of rainwater to the rest of the storm water system. Finally, water will then flow to a large retention area when the capacity of the second step reaches its limit. This last retention area will also be an open space used as sporting facility and social area. It will also be designed to allow its progressive flooding until its capacity is reached and water flows to the primary drain.

This three step system could enhance the capacity of the water management systems for return periods up to 300 years (precipitation in 24 hours). The proposed measures are expected to be highly cost effective, in particular when the increased resilience of the San Martin Municipality is considered. This design will meet the new Metropolitan regulation of San Salvador (2009), requiring water harvesting in new housing developments in the upper basins. It is also consistent with current building codes and standards in San Salvador.

La Bretaña is an example frequently found in low and middle-income countries where investments lacking consideration to the impacts of climate change can lead to maladaptation and the loss of scarce financial resources. Funds requested for this project are intended to transform maladaptation into resilience in this community. The emblematic nature of La Bretaña for El Salvador will enhance the possibility that other communities extract positive lessons helping them to develop climate change adaptation initiatives.

The second site selected by the project is the municipality of Santa Tecla (West part of San Salvador Metropolitan Area), with a population of 121,000 inhabitants. Santa Tecla illustrates different type of conditions than the municipality of San Martin, since it is located in the upper parts of the Arenal Montserrat watershed, which runs through most of San Salvador. Therefore, any intervention in this municipality has a significant impact on the lower lying areas of San Salvador.

The project will focus on two main interventions in Santa Tecla Municipality. The first will be to implement decentralized water management practices throughout the municipality to retain water during extreme events and diminish the peak volumes and speed of runoff. This will involve an in depth assessment of measures that can be taken in existing infrastructure (such as housing, parks, secondary drainage piping, etc), to increase the capacity of Santa Tecla as a whole to act as a buffer zone for rain water. Furthermore, Santa Tecla lies immediately south of the “Parque el Espino”, a protected area on the slopes of the San Salvador Volcano, which already serves as a buffer zone for the metropolitan area. Given this proximity, one option will be to explore the capacity of this green area to retain additional volumes of water, and assess whether the diversion of runoff to this area is feasible and desirable.

The second intervention in Santa Tecla will be focused on the low income residential area called La Cruz. Currently this area is a slum occupied by marginalized families. In these conditions, these dwellers are highly vulnerable to any extreme rainfall event, and also pose a threat to the municipality of Santa Cruz. Currently there is no water management infrastructure in the community. The Government of El Salvador will formalize this neighborhood with a housing project to accommodate 128 families. As in La Bretaña, the AF project will intervene in the design and construction of this complex to ensure that appropriate water management measures are put in place. Among the options to be assessed is a similar three step system as the one proposed for La Bretaña, but ultimately in depth feasibility studies will define what the most cost effective option is for a community of this size.

The AF intervention will allow the new residential area to cope with extreme events, and will help demonstrate how low-income neighborhoods can become an integral part of reducing vulnerability to flooding in the lower areas of the metropolitan area. It will also demonstrate the benefits of building resilient communities to climate variability and climate change, reducing the demand of natural resources, and alleviating the pressure in the metropolitan storm water system.

Component two. Institutional Strengthening

Institutional barriers constitute a major obstacle to foster adaptation and build resilience to climate change. Institutions, particularly public institutions, are often reluctant to change their structure and operation in order to better respond to the challenges of climate change. El Salvador currently counts on the political will of the MOP and the MARN, and the support of the President of El Salvador, to introduce institutional changes that will allow them to better respond to climate change and other challenges they currently face. The Government of El Salvador recognizes the limitation of current institutional approaches, and this AF financed project will assist the country to better address this national priority.

This second component will support institutional strengthening to assist El Salvador’s preparedness for climate change. The Government of El Salvador has prioritized the following four outputs: planning guidelines to improve resilience and adaptation to climate change in human settlements; improving building codes and standards for public

infrastructure to meet conditions under climate change scenarios; technical and economic decision making tools for infrastructure in the context of climate change; and building collaboration within the public sector at the national level and between the national and municipal level to build multidimensional responses to climate change. The Project is designed, at the request of the Government, to be a shining example of promoting climate resilient infrastructure development in El Salvador and in the Central America region.

Output 2.1 will support public officials in the design of planning guidelines to build adaptation and resilience to climate change in urban areas.

The uncertainty of when, where, how intense, and how often the impacts of climate change will affect urban areas in El Salvador and neighboring countries requires periodically upgrading planning guidelines. After all, adaptation and resilience is an iterative process over time and space, not a one-time effort. Conditions in urban societies change also dynamically, requiring periodical adjustments in planning guidelines. It is worth noting that the life span of infrastructure in urban areas is more than 70 years. Thus the built environment constructed now will operate under different climatic conditions in the following decades. The project will convene two national workshops and one regional workshop in Central America on planning urban growth for adaptation to climate change. These workshops will be oriented to help national and municipal decision-makers and planning officials considering alternatives for adapting urban areas to climate change.

The project will create a portal of information and electronic resources on best regional practices (Central America) for adapting urban areas to climate through the use of resilient infrastructure. Furthermore, the project will also facilitate the exchange of experience and knowledge obtained by countries that are using innovative approaches to build resilience to climate change through the design of guidelines, norms, construction standards, and building codes to adapt infrastructure to climate change.

These lessons constitute valuable references that can help avoiding maladaptation in El Salvador. Even though they have been created to meet specific local conditions different to these in El Salvador, the project will use these lessons to strengthen the skills from national and local officials and help them develop standards designed to meet conditions, resources, and needs of El Salvador.

Output 2.2 Developing these skills is necessary to adjust existing standards to a range of new conditions forced by climate change in the coming decades. The project will finance technical training for the design of planning guidelines and norms, construction standards, and building codes. The project will organize two days technical training sessions every six months. Each workshop will invite from three to four international experts or public officials from other countries and cities in charge of the design and implementation of planning guidelines and norms, building standards and codes for sustainable infrastructure. The training will seek to extract useful lessons for the design of appropriate national and regional codes, norms, and standards and guidelines that will build resilient communities to climate change in El Salvador.

Output 2.3 will develop technical and economic decision making tools for infrastructure development in the context of climate change, including the use of probabilistic risk

models. Although the institutional strengthening component of the Project focuses mainly on the MOP and the MARN, it will draw benefits on other institutions, particularly to the Metropolitan Planning Agency of San Salvador (OPAMSS), FONAVIPO, the municipal government of Santa Tecla, San Martin and other municipalities.

Output 2.4 The process of adapting to climate change requires integrated multidimensional strategies and actions. The project will seek to enhance collaboration within the public sector at the national level and between officials at the national and the municipal level. The project will develop several platforms for communication and exchange the information needed to improve collaboration and identify synergies among public officials from diverse sectors and levels of government. This is a fundamental step for the design of integrated multidimensional strategies and actions to build climate change resilience. The Internet portal of the Project will include a database containing lessons learnt from the collaboration among public officials and between the public sector and other sectors of society.

Component Three. Knowledge Management and Communication

The appropriation of knowledge generated from the project by stakeholders is an important resource that will assist communities in better responding to the challenges of climate change. However, it is a challenging task. The Project will make use of four instruments as part of its strategy to disseminate and communicate knowledge and information to the different actors involved in the Project and other potential users in El Salvador.

Output 3.1 This output will disseminate the lessons learnt from the obstacles and opportunities encountered through the implementation of the project through workshops with local governments and stakeholders. The objective of these workshops is to accelerate the dissemination of knowledge during the implementation of the project instead of waiting until its completion. The workshops will also foster similar initiatives in other communities, thus leveraging the Project activities, building trust and understanding among stakeholders and public officials involved in their development. The project will carry out one-day workshops, every six months.

The workshops will bring together members of the project with mayors, public officials and decision makers from other municipalities, together with representatives from professional associations, private sector, community based organizations, NGOs, and academia. This will allow constituting an open space to ensure a national participation in finding adaptive solutions for the development of sustainable infrastructure.

Output 3.2 To increase knowledge and awareness on climate change adaptation and the use of sustainable infrastructure, a communication campaign will be designed and implemented. The campaign will be diffused through the media, professional forums, community events, and schools. The communication strategy will be based on the links of current urban and environmental problems in San Salvador with the impacts of climate change. The campaign is designed to keep the communities informed on climate change and the benefits of constructing resilient and sustainable communities through adaptive measures, and how individual measures and behaviors have impacts on sustainable infrastructure. Examples and lessons learnt from the project will be used to illustrate

benefits and opportunities from adaptation response. The activities of this campaign will target primarily vulnerable communities from San Salvador Metropolitan Area

Output 3.3 will ensure the diffusion of the planning guidelines and norms, construction standards, building codes and tools prepared by the Project through technical workshops. The workshops will be oriented to public officials from the national and municipal governments, and professional associations working with infrastructure planning, development management and maintenance In El Salvador.

Building resilience and adaptation to climate change is a process that requires the development of new approaches and ways of thinking about growth and development. Incorporating the challenges posed by climate change in the training of new professionals will facilitate the process towards sustainability.

Output 3.4 will work jointly with universities in El Salvador to incorporate in their curricula for engineers and architects, the information, knowledge and tools, necessary to develop climate proofed infrastructure and construct resilient a resilient society. The Project will develop practical and conceptual knowledge to improve the curricula used to train future construction professionals. A regional approach will also be explored to share that knowledge with universities in the Central American region.

- B.** Describe how the project / programme provides economic, social and environmental benefits, with particular reference to the most vulnerable communities.

Vulnerability to flooding and water stress in San Salvador Metropolitan Area is a major challenge for the development of the country and each extreme event weakens the budget allocated for public social programmes. The recurrence of such events will be exacerbated by climate variability and climate change in the coming decades (second communication of the Government of El Salvador 2010). IPCC and a number of international scholars consider vulnerability as the result of the exposure of individual, social groups or communities to extreme events and their adaptive capacity to cope, resist and overcome the negative consequences of that exposure (Adger 2006, IPCC 2007).

Vulnerable groups to flooding and erosion caused by runoff and water stress in San Salvador Metropolitan Area are low-income neighborhoods in the lower parts of the metropolitan areas. However, reducing their vulnerability to flooding and assisting them to adapt to climate change does not depend entirely from direct actions in their community but from interventions in the upper basins that reduces the amount of runoff.

Flooding problems in these communities will increase during the next decades if actions are not taken to reduce the flow and speed of runoff in the upper part of the basins. A larger number of communities will have their exposure to flooding increased if adaptation actions are not implemented in the short-term.

The intervention in the urbanization project, La Bretaña, will have a direct impact in reducing climate change vulnerability of 1875 low income households (approximately 10,000 people) and an indirect impact on the communities of the municipality of San Martín (72,758 people). In the municipality of Santa Tecla the AF project intervention will have a direct impact on the community of La Cruz (128 households) and the municipality of Santa Tecla (121,908 people). This intervention will also have an indirect impact in reducing the runoff in the lower basin of San Salvador Metropolitan Area.

The use of resilient infrastructure is a cost effective approach to capture, retain, and recycle water in the upper basin in order to reduce vulnerability to flooding in the lower basin and alleviate water stress in San Salvador Metropolitan Area.

It is worth noting that San Salvador's case illustrates frequent problems encountered in urban areas of low and middle-income countries where rapid urbanization and extreme modifications to the landscape, simultaneously with incomplete urbanization, social inequality, poverty, and limited financial, technical, and human resources, creates extended vulnerability to climate variability and climate change. This project seeks to move beyond actions focusing only in a limited number of inhabitants or communities. It seeks to create a sustainable process to build resilience and adaptation to climate change, eventually leading to a sustainable development process in El Salvador with positive spillover effects on the Central American region.

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

The cost effectiveness analysis of the project considers three different options: the status quo, efforts to reduce vulnerability to flooding with a traditional approach of infrastructure, and the proposed ecosystem services and sustainable infrastructure approach proposed by the Project.

Climate related disasters have in El Salvador a high economic, social, and environmental cost. Current efforts to reduce those costs have not yielded adequate results yet. Infrastructure damaged by flooding after a climatic event is reconstructed at the same locations and with only slight modifications in their building design. Most likely, the same infrastructure is damaged during the next extreme event, sometimes only a few months later. The evacuation of inhabitants located in hazardous areas is particularly complex. The number of inhabitants in risk situation, and their reluctance to relocate to other areas limits the alternatives to reduce their vulnerability. Corrective actions in the lower part of the basin are expensive and have very limited real benefits given the increase runoffs in the upper part of the basin.

The frequent evacuation of vulnerable groups is an immediate reactive response but not a solution to this problem that will see its recurrence be exacerbated through climate change. This path of reactive responses to climatic events will clearly have severe consequences under climate change scenarios and are clearly not cost effective. El Salvador and the Metropolitan Area of the capital city cannot afford maintaining the status quo. This situation is recognized by the National Government.

The second option considered to address flooding problems is the use a traditional approach to address the issues. Some of the solutions proposed to reduce the vulnerability of San Salvador Metropolitan Area to flooding suggest the construction of retention dams close to the areas frequently flooded. However, this approach poses various problems: it requires a large amount of space to meet return period of 50 years or more, this space is not available in the metropolitan area which is intensively urbanized; it has a high cost due to the necessary size; opening vacant space within the urban area represent risks of installation of illegal settlements in this space, creating new issues and the obstruction of the municipal stormwater system. Therefore, the traditional approaches such as the one described above are not cost effective.

The third alternative considered is the approach proposed by the Project. The use of sustainable infrastructure and ecosystem services will be use to capture, retain, and recycle rain water in the upper parts of the sub basins in San Salvador Metropolitan Area, in order to reduce runoff and avoid the overflow of primary and secondary drains of the municipal stormwater system. This decentralized alternative reduces the vulnerability to flooding in the Metropolitan Area. The use of roofs and other existing surfaces to capture precipitation in dwellings or other building reduces the amount of runoff reaching the primary drains in the upper part of the basins and as a result, reduces the speed and amount of runoff in the lower parts of the basins. An integrated system of parks, public spaces, sport facilities and other retention areas created at the neighborhood level in the upper basins diminish the need of large infrastructure at the city level and in the lower part of the basins. (Furthermore, this alternative also creates social open spaces that indirectly respond to social problems faced in urban areas). The retention of runoff at the household and neighborhood level also facilitates the use of storm water for urban uses at the same place where captured, and thus reduces pressure on water resources. This approach allows the progressive adjustments that the system needs to meet new pressures induced by climate change. It is an effective manner to enhance the resilience and climate change adaptation capacity of the urban area. Hence this alternative is considered the most cost effective.

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

The 5-Year National Development Plan 2010-2014 of El Salvador identifies climate change as a serious challenge for national development. It recognizes the importance to reduce the social and urban vulnerability of the country to natural hazards. The plan makes emphasis on risk reduction and proposes the strengthening of the National Civic Protection System, the creation of a Technical Civic Protection Commissions at the departmental and municipal level, and improving the National Early Warning System.

These are important steps to increase the protection of the population in a country exposed to extreme climatic events. However, it's necessary that these risk reduction strategies and actions take a fundamental step beyond to build sustainable resilience and adaptation to climate change. The Project will assist the government in El Salvador in revising its approach to incorporate more integrated strategies leading to resilience and climate change adaptation. The MOP and the MARN have specifically requested this support.

The five-year plan has as priority the reduction of poverty and income inequality in the country and an efficient reduction of environmental risks with results in the short and long term. It also promotes citizen participation in the creation of public policies. These are strategies consistent with the objectives and strategies of this project.

The project recognizes that adapting to climate change is not dissociated from development challenges of society in El Salvador (UNDP 2005). The reduction of vulnerability to climate change is related with strengthening livelihood alternations of lower-income social groups and multidimensional strategies reducing environmental stress.

Building resilient communities to climate change requires institutional strengthening considered in detail by component three of the Project. The National Development Plan also calls for the implementation of a social urban programme (Comunidades Urbanas Solidarias) to reduce poverty and improve the livelihoods of marginalized groups in the country. One of the first (of two) communities selected for this pilot social program is the Municipality of San Martin where the demonstrative case of La Bretaña is located. The second case (La Cruz) in the municipality of Santa Tecla, will also strengthen an important development project for the municipality and the vice ministry of housing.

Currently the MOP is creating a new direction for strategic risk management and climate change adaptation. 40 new positions for specialized professionals will be opened. The Project will serve as an important vehicle to strengthen this newly formed department and prepare valuable tools to enhance their capacity.

Furthermore, the MARN is in the preparation process of a National Climate Change Plan that integrates mitigation and adaptation strategies. The Project will provide consistent inputs for the implementation of this Plan.

E. Describe how the project / programme meets relevant national technical standards, where applicable.

The project meets national and sub-national standards related to the development of infrastructure. The reduction of social and urban vulnerability is consistent with the standards established in the 2005 Law for Civil Protection and the Reduction of Environmental Emergencies. The project is also in line with the new regulation of San Salvador Metropolitan Area (OPAMSS 2009) requiring water harvesting in new housing developments in the upper basins. It is also consistent with current building codes and standards in San Salvador. It is important to note that under component 2 the project will seek to update national construction and infrastructure standards to increase the country's resilience to Climate Change.

UNDP supported donor funded projects are required to follow the mandatory requirements outlined in the UNDP Programme and Operational Policies and Procedures (UNDP POPP). This includes the requirement that all UNDP development solutions must always reflect local circumstances and aspirations and draw upon national actors and capabilities. Moreover, all UNDP supported donor funded projects are appraised before approval. During appraisal, appropriate UNDP representatives and stakeholders ensure that the project has been designed with a clear focus on agreed results. The appraisal is conducted through the formal meeting of the Project Appraisal Committee (PAC) established by the UNDP Resident Representative. The PAC representatives are independent in that they should not have participated in the formulation of the project and should have no vested interest in the approval of the project. Appraisal is based on a detailed quality programming checklist which ensures, amongst other issues, that necessary safeguards have been addressed and incorporated into the project design.

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

There is no duplication with other funding sources. El Salvador has currently no other funding sources for reducing the vulnerability of communities in San Salvador to flooding and water stress and for building resilience and climate change adaptation capacity. The project builds upon national urban infrastructure development investments to ensure the incorporation of cost effective, state of the art adaptation measures, thus ensuring the complementarity of national investments with the financing provided by the Adaptation Fund.

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

The generation, appropriation and dissemination of knowledge are important elements for the success of the Project. This is why a specific Component (3) has been dedicated to Knowledge management and communication. A detailed description of Component 3 can be found in Part 2, Project Justification, Section A.

H. Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation.

During the elaboration process of the Project proposal the MOP, the MARN and UNDP have jointly organized an international conference on infrastructure Climate proofing in El Salvador. International experts from prestigious International Universities presented on the challenges that climate change poses on infrastructure development and its repercussion on society, including possible solutions for adaptation. Over 300 people, representing the public and private sector, civil society, the media and academia participated. High-level representatives of the Ministry of Public Work and the Ministry of Environment of Guatemala, Honduras, Nicaragua, Panama and Dominican Republic also participated. This event demonstrated the importance of climate change adaptation in relation to infrastructure in El Salvador and the Central American region.

Following the conference, a workshop for the preparation of the project proposal has been organized to define adaptation national priorities and receive inputs. In this workshop participated, high-level representatives and their technical counterparts from the MOP, MARN and SNET, Civil Protection, CEPREDENAC, the Association of Salvadoran Engineers and Architects (ASIA), the Salvadoran Chamber of Construction (CASALCO), FOVIAL, Vice Ministry of Housing and Urban Development (VMVDU), SIECA University Of California Riverside, Yale University, The Swiss Federal Institute of Technology Zurich (ETHZ) and UNDP.

Moreover, specific bilateral consultations were held during the elaboration of the proposal with the MARN and SNET, MOP, VMVDU, FONAVIPO and OPAMSS.

This Project will integrate climate change adaptation components to initiatives already programmed as La Bretaña and La Cruz urbanization projects. For each of these initiatives consultation processes were previously held with the local governments and the local communities by Fonavipo (La Bretaña), VMVDU and Santa Tecla municipality (La Cruz).

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

Climate related disasters have a high economic, social, and environmental cost in El Salvador. Current efforts to protect society from these impacts have been limited to reactive responses, seeking to protect human life through the evacuation of the most vulnerable population. Dwellings and infrastructure damaged by flooding, erosion and landslides after a climatic event have been reconstructed in the same locations and with only slight modifications in their building designs. The same areas have been damaged during the following extreme event, sometimes only a few months apart. Particularly critical is the lost of human life and the damage of property among the poorest groups. Low socioeconomic conditions in a large percentage of the population in the country and the limited financial resources of the National Government to meet the demand of housing and urban space, hinders the relocation of vulnerable inhabitants located in hazardous areas.

The large number of inhabitants in these areas, and their reluctance to relocate to safe areas limits the alternatives to reduce their vulnerability. The country, and particularly San Salvador Metropolitan Area, cannot afford to follow the same path of growth under climate change scenarios. Current social and urban vulnerabilities to climate variability will be expanded and aggravated by climate change. The National Government of El Salvador recognizes the urgent need of adapting to climate change within the context of sustainable development. Initial provisions have been included in the Quinquennial Development Plan 2010-2014. The National Government has also strengthened and expanded the mandate of the MOP and the MARN to address risk reduction and prevention in El Salvador. Despite the political will of the government, these ministries and other agencies in the national and municipal governments need to strengthen their capacities and expertise to build adaptation and resilience to climate change. The country needs also to expand public awareness about climate change and to foster proactive engagement of the communities. The Project is designed to assist El Salvador, and particularly San Salvador Metropolitan Area to overcome obstacles and deficiencies as to reduce climate change vulnerability and to impulse a sustainable adaptation process.

The project will accelerate the learning curve of the public sector and society necessary to build resilience. The three components of the project provide the following contributions to this objective.

Component 1- Infrastructure Climate Proofing in San Salvador Metropolitan Area

The negative consequences of climatic events in San Salvador Metropolitan Area have evidenced the importance and need to move beyond limited reactive responses. One of the major obstacles to improve responses to these events and transit from reactive to preventive responses is incomplete information about the vulnerability to flooding, erosion, and landslides in the metropolitan area. Existing studies documenting flooding problems focus only in some of the basins. There is no study addressing the whole metropolitan area or basic information like the proposed integrated analysis of vulnerability to flooding of San Salvador Metropolitan Area. Furthermore existing studies do not consider the impacts of climate change in their analysis of the flooding problems. There is no study that documents

social and urban vulnerability and exposure to climate change of San Salvador Metropolitan Area or any other urban area in the country. The lack of an integrated hydrological study of the metropolitan area aggravates the uncertainty associated with the impacts of climate change and creates obstacles to the design and implementation of adaptive actions.

The project will develop knowledge and strengthen local capacities and expertise to reduce social and urban vulnerability. The cost benefit and technical feasibility study will provide a range of decentralized infrastructure solutions that can be applied in the upper basin of San Salvador Metropolitan Area to prevent flooding, erosion and other damages in the lower basin and enhance the resilience of urban communities to the negative impacts of climate change.

The support from the Adaptation Fund is instrumental to establish to enhance the urban planning process and to provide resilient infrastructure solution to respond to the increase of extreme precipitations forecasted by climate change scenarios.

The AF intervention realized in output 1.3 will build upon El Salvador Government’s investment plans for low income urban development and incorporates innovative adaptation measures that will make the investments more sustainable and cost effective. Without the intervention from the Adaptation Fund, the urbanization of La Bretaña is likely to be developed devoid of adaptation measures and risks to increase vulnerability of communities in the municipality of San Martin. Similarly in Santa Tecla, the Project of La Cruz will not integrate appropriate water management measures that can cope with climate change scenarios without the support of the AF project. The AF project will also ensure that the status quo will be modify as to implement decentralized water management practices throughout the municipality to retain water during extreme events and diminish the peak volumes of runoff and their impacts on the lower part of San Salvador Metropolitan Area.

La Bretaña and Santa Tecla cases set valuable precedents that illustrate the benefits of reducing social and urban vulnerability through climate change adaptation. They serve as examples of the steps needed to build resilience within the framework of sustainable development and will constitute dynamic tools to help other municipalities learning from these experiences and replicate them.

	Baseline (without AF Resources)	Additionality (with AF Resources)
Component 1	San Salvador Metropolitan Area counts only with a few isolated hydrological studies and do not have an integral analysis of the vulnerability of its areas to precipitation. Regarding urban planning, there is a lack of information that prevents decision makers to take concrete adaptive measures to reduce the exposure to climatic events of vulnerable communities	The development of an integrated analysis of vulnerability to precipitation in San Salvador Metropolitan Area will define the areas where the retention and capture of runoff water can be more effective to reduce the overflow of primary and secondary drains in the municipal storm water system and will assist local and national authorities and stakeholders

	in the Metropolitan Area.	in identifying social groups and areas of the city where investment in resilient infrastructure can be more effective for climate change adaptation. Likewise, such studies will assist decision makers in urban planning measures to reduce citizens' vulnerability.
	Solutions to respond to increased precipitation in San Salvador Metropolitan Area have focused principally downstream and have not given satisfactory results.	The project will evaluate a range of decentralized infrastructure solutions that can be applied in the upper basin of San Salvador Metropolitan Area to prevent flooding, erosion and other damages in the lower basin or downstream.
	The Urbanization La Bretaña will be developed with a traditional storm water system. With such a design this project is likely to be vulnerable to extreme rainfall events expected even in the most benign climate change scenarios for El Salvador.	The project will incorporate climate resilient infrastructure measures in La Bretaña to ensure that the urbanization is constructed with a sound water management system that is cost effective and can cope with climate induced water stress over the lifetime of the investment.
	Status quo is maintained in Santa Tecla water management system and during extreme events rainfall and runoff will impact the lower part of San Salvador Metropolitan Area.	With support of the AF project, a decentralized water management practices throughout Santa Tecla municipality to retain water during extreme events and diminish the peak volumes of runoff and their impacts on the lower part of San Salvador Metropolitan Area.

Component 2- Institutional Strengthening

Strengthening national and local capacities is an essential step to help public institutions becoming more efficient to respond to the challenges inflicted by climate change. The second component of the project is designed to support institutional strengthening that will enhance El Salvador preparedness for climate change. Without the intervention of the Adaptation Fund, the four outputs included in this component and its respective outcome will not be reached and the National and Local government will lack planning guidelines that incorporates climate change adaptation for the development resilient human settlements, building codes and standards will not be updated and modify to cope with the new climate change reality, and climate change response will not be integrated.

	Baseline (without AF Resources)	Additionality (with AF Resources)
Component 2	Current Infrastructure planning guidelines and norms, construction standards, building codes and decision making tools consider past rainfall patterns and do not integrate new projected risks from climate change	The Project will revise current Infrastructure planning guidelines and norms, construction standards, and building codes to integrate climate change considerations and enhance decision making tools to the new reality of climate change.
	Lack of coordination within the public sector at the national level and between officials at the national and the municipal level to promote comprehensive adaptation measures in response of increasing precipitations	The project will enhance collaboration and synergies to promote integrated and multidimensional responses to the increased precipitation forecasted in climate change scenarios.

Component 3- Knowledge Management and Communication

The appropriation of knowledge generated from the project by stakeholders in society is an important resource that will assist communities in better responding to the challenges of climate change. However, it is challenging task. The Project make use of four instruments as part of its strategy to disseminate and communicate knowledge and information to the different actors involved in the Project and other potential users in El Salvador: workshops with local governments and stakeholders; communication campaign to increase knowledge and awareness on adaptation to climate change; technical workshops for the design of planning guidelines, norms, construction standards, and building codes; and the incorporation of climate change adaptation considerations for Infrastructure and urban planning in engineers and architects academic curricula in national universities.

Support from the Adaptation Fund is instrumental to implement these activities. It is rather difficult for a country with strong resource limitations to divert scarce funds to carry out these important adaptation activities. The appropriation of the knowledge generated by the Project and its communication to the society will create solid basis to foster new ways of thinking development alternatives that build resilience and climate change adaptation in El Salvador.

	Baseline (without AF Resources)	Additionality (with AF Resources)
Component 3	Lack of understanding and diffusion of the links between current urban and environmental problems in San Salvador Metropolitan Area with the impacts of climate change.	Increase knowledge and awareness of the public sector, the private sector and the communities on climate change adaptation and the use of sustainable infrastructure.

PART III: IMPLEMENTATION ARRANGEMENTS

A. Describe the arrangements for project / programme implementation.

The Government of El Salvador will execute this four year project with the support of UNDP under UNDP's National Implementation modality (NIM).

The Ministry of Public Works, Transport, Housing and Urban Development (MOP) will be the national implementing agency for the Project. The MOP will be responsible for ensuring that the stated project objective and components are delivered, and that resources are allocated and disbursed in an efficient and effective manner as will be detailed in the Project Document.

The implementation of the Project will be carried out under the general guidance of a Project Steering Committee (PSC), specially formed for this purpose. It will be chaired by the Minister of Public Work, Transport, Housing and Urban Development, the Minister of Environment and Natural Resources and the Resident Representative of UNDP El Salvador.

The PSC will be responsible for ensuring effective coordination between this Project and other relevant initiatives in El Salvador.

The Project structure will be constituted by a National Project Director (NPD) and a National Project Coordinator (NPC).

The NPD will be a high-level representative of the MOP and will be responsible for supervising the Project on behalf of the MOP and orienting and advising the National Project Coordinator on Government policy and priorities.

The NPD will also be responsible for maintaining regular communication with the MARN, and ensuring that their priorities and interests are addressed effectively. The NPC will be located in the MOP and will be supported by a technical team. The NPC has the authority to run the project on a day-to-day basis on behalf of the MOP within the constraints laid down by the PSC. The Project Manager is responsible for day-to-day management and decision-making for the project. The NPC prime responsibility is to ensure that the project produces the results (outputs) specified in the project document, to the required standard of quality and within the specified constraints of time and cost. The NPC will be contracted following the rules and procedures of UNDP.

In addition, a Consultative Committee will be conformed. It will be composed by representatives from local governments (San Martin and Santa Tecla) the civil society, the private sector and the academia. The Consultative Committee will provide guidance and technical feedback to the NPC in regard of the Project Activities.

The MOP will sign letter of agreements with relevant counterparts for the execution of specific components, including the Mayors of Santa Tecla, Verapaz and San Martin.

The Project Director in collaboration with the Project Coordinator will prepare an Annual Work Plan (AWP) that incorporates project activities and results to be delivered.

The AWP will define the execution time frame and budget for each activity and the responsible parties for its implementation. The AWP will have to be approved by the PSC. The first AWP will be finalized and incorporated into the Project Document within 30 days of its signature. The participation of project counterparts will be essential for the success of the planning phase, during which the Annual Work Plan will be prepared.

Norms and procedures detailed in UNDP's Programme and Operations Policies and Procedures will be applied. For its part, UNDP will provide support to the Implementing partner, in order to maximize its reach and impact as well as the quality of its products. Moreover, on the request of the MOP, UNDP will administrate the resources in accordance with the specific objectives defined in the Project Document, and aligned with its key principles of transparency, competitiveness, efficiency and economy. The financial management and accountability for the resources allocated, as well as other activities related to the execution of Project activities, will be undertaken under the supervision of UNDP EI Salvador Country Office.

Once the project is approved and an operational annual work plan is prepared, UNDP EI Salvador CO will be able, in those specific cases agreed with project counterparts, to charge the project directly for Execution Support Services according to UNDP's cost recovery policy.

UNDP will undertake the internal monitoring of the Project and of evaluation activities, taking into account from the outset local capacities for administering the project, capacity limitations and requirements, as well as the effectiveness and efficiency of communications between ministries and other institutions that are relevant to the project.

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

A complete risk matrix will be elaborated prepared during the preparation of the full Project Document to be submitted to the Adaptation Fund for approval.

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

The monitoring and evaluation (M&E) scheme will be applied in accordance with the established UNDP procedures throughout the project lifetime. As an implementing partner, MOP, together with the UNDP Country office in El Salvador will ensure the timeliness and quality of the project implementation. The M&E plan will be implemented as proposed in Table 5. Technical guidance and oversight will be also provided from the UNDP's Regional Bureau for Latin America and the Caribbean (RBLAC), as well as the Project Steering Committee (PSC).

Project start: A *Project Inception Workshop* (IW) will be held within the first 3 months of project start with those with assigned roles in the project management, AF, UNDP El Salvador CO and where appropriate/feasible, regional technical advisors as well as other 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 National Project Director, shared with the PSC and submitted to the Donor. The APR will be prepared with progresses 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 being made toward the achievement of outcomes and will identify course correction 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 as recommendations for enhanced implementation during the final half of the project's term.

Periodic Monitoring through site visits: UNDP El Salvador CO will conduct visits to project sites based on the agreed schedule in the project's Annual Work Plan to assess, at first hand, project progress. Other members of the PSC may also join these visits.

Project Closure: An independent Final Evaluation will take place 3 months prior to the final PSC meeting and will be undertaken. The final evaluation will focus on the delivery of the project's results as initially planned and as corrected after the mid-term evaluation, if any such correction takes place. The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals.

Table 2. Monitoring and evaluation plan of the proposed project

Type of M&E activity	Responsible Parties	Budget US\$	Time frame
Inception Workshop and Report	<ul style="list-style-type: none"> ▪ Project Manager ▪ UNDP CO, RBLAC, AF 	3,000	Within first two months of project start up
Measurement of Means of Verification for Project Progress on <i>output and implementation</i>	<ul style="list-style-type: none"> ▪ Oversight by Project director ▪ Project team 	10,000	Annually prior to ARR/PIR and to the definition of annual work plans
ARR/PIR	<ul style="list-style-type: none"> ▪ Project director and team ▪ UNDP CO 	0	Annually
Periodic status/ progress reports	<ul style="list-style-type: none"> ▪ Project director and team 	0	Quarterly/

			Annually
Mid-term Evaluation	<ul style="list-style-type: none"> ▪ Project director and team ▪ UNDP CO ▪ UNDP RBLAC ▪ External Consultants (i.e. evaluation team) 	30,000	2013
Final Evaluation	<ul style="list-style-type: none"> ▪ Project team, ▪ UNDP CO ▪ External Consultants (i.e. evaluation team) 	34,000	2015, at least three months before the end of project implementation
NIM Audit	<ul style="list-style-type: none"> ▪ UNDP CO ▪ Project director and team 	3,000	annual
Visits to field sites	<ul style="list-style-type: none"> ▪ UNDP CO ▪ Government representatives ▪ Project Unit ▪ UNDP RBLAC 	20,000	Yearly
TOTAL indicative COST		US\$ 100,000²	

D. Include a results framework for the project proposal, including milestones, targets and indicators.

Detailed results framework with SMART indicators, their baseline and targets will be prepared during the preparation of the full Project Document to be submitted to the Adaptation Fund for approval.

² All costs in this table do not pertain to the costs of UNDP staff time and travel. Those costs are covered by the MIE fee.

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


A. RECORD OF ENDORSEMENT ON BEHALF OF THE GOVERNMENT ¹

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

Antonio Cañas, Minister’s Office Advisor, Ministry of Environment and Natural Resources
Date: October, 19, 2010

See Annex for a copy of the endorsement letter.

B. IMPLEMENTING ENTITY CERTIFICATION *Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person’s name, telephone number and email address*

<p>I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans and subject to the approval by the Adaptation Fund Board, understands that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.</p>	
 <p>Yannick Glemarec Director Environmental Finance UNDP</p>	
Date: <i>October 22, 2010</i>	Tel. and email: yannick.glemarec@undp.org
Project Contact Person: Oliver Page	
Tel. And Email: +507-302-4548 ; oliver.page@undp.org	

¹. Each Party shall designate and communicate to the Secretariat the authority that will endorse on behalf of

the national government the projects and programmes proposed by the implementing entities.

References

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Annex A



ADAPTATION FUND

Letter of Endorsement by Government



Ministerio de Medio Ambiente
y Recursos Naturales

October 19th 2010

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

Subject: Endorsement for “Promoting climate change resilient infrastructure development in San Salvador Metropolitan Area” .

In my capacity as designated authority for the Adaptation Fund in El Salvador, I confirm that the above national project proposal is in accordance with the government's national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the country.

Accordingly, I am pleased to endorse the above project proposal with support from the Adaptation Fund. If approved, the proposal will be coordinated and implemented by the Ministry of Public Works, Transportation, Housing and Urban Development.

Sincerely,



A handwritten signature in black ink, appearing to read 'Antonio Cañas'.

Antonio Cañas
Minister's Office Advisor
National Designated Authority

Annex B

UNDP Environmental Finance – Specialized Technical Services

Stage	Specialized Technical Services Provided
Identification, Sourcing and Screening of Ideas	Provide information on substantive issues and specialized funding opportunities (SOFs)
	Verify soundness and potential eligibility of identified idea
Feasibility Assessment / Due Diligence Review	Technical support: provide up-front guidance; sourcing of technical expertise; verification of technical reports and project conceptualization; guidance on SOF expectations and requirements
	Provide detailed screening against technical, financial, social and risk criteria and provide statement of likely eligibility against identified SOF
	Assist in identifying technical partners; Validate partner technical abilities.
	Obtain clearances – SOF
Development & Preparation	Technical support, backstopping and troubleshooting
	Technical support: sourcing of technical expertise; verification of technical reports and project conceptualization; guidance on SOF expectations and requirements
	Verify technical soundness, quality of preparation, and match with SOF expectations
	Negotiate and obtain clearances by SOF

Stage	Specialized Technical Services Provided
	Respond to information requests, arrange revisions etc.
	Verify technical soundness, quality of preparation, and match with SOF expectations
Implementation	Technical and SOF Oversight and support
	Technical support in preparing TOR and verifying expertise for technical positions. Verification of technical validity / match with SOF expectations of inception report. Participate in Inception Workshop
	Technical information and support as needed
	Technical support, participation as necessary
	Advisory services as required
	Allocation of ASLs
	Technical support and troubleshooting, Support missions as necessary.
	Project visits – at least one technical support visit per year.
	Technical support, validation, quality assurance
	Return of unspent funds
Evaluation and Reporting	Technical support, progress monitoring, validation, quality assurance
	Technical support, participation as necessary
	Technical support in preparing TOR and verifying expertise for technical positions. Verification of technical validity / match with SOF expectations of inception report. Participate in briefing / debriefing
	Technical analysis, compilation of lessons, validation of results
	Dissemination of technical findings

Service standards:

1. initial response to communication within 2 working days
2. full response to communication (with the exception of a response requiring travel) within 10 working days