



PROGRAM FRAMEWORK DOCUMENT (PFD)

TYPE OF TRUST FUND: LDCF

TYPE OF AGENCY: Qualifying GEF Agency

PART I: PROGRAM IDENTIFICATION

Program Title:	Climate Proofing Development in the Pacific		
Country(ies):	Timor-Leste, Tuvalu, Vanuatu	GEF Program ID: ¹	5037
Lead GEF Agency:	AsDB	GEF Agency Program ID:	
Other GEF Agency(ies):	(select) (select) (select)	Submission Date:	2013-12-17
Other Executing Partner(s):		Program Duration(Months)	60
GEF Focal Area (s):	Climate Change	Agency Fee (\$):	1,112,000

A. FOCAL AREA STRATEGY FRAMEWORK²:

Focal Area Objectives	Expected FA Outcomes	Expected FA Outputs	Type of Trust Fund	Indicative Financing (\$)	Indicative Cofinancing (\$)
CCA-1 (select)	Outcome 1.1: Mainstreamed adaptation in broader development frameworks at country level and in targeted vulnerable areas	Output 1.1.1: Adaptation measures and necessary budget allocations included in relevant frameworks	LDCF	410,000	1,200,000
CCA-1 (select)	Outcome 1.2: Reduced vulnerability to climate change in development sectors	Output 1.2.1: Vulnerable physical, natural and social assets strengthened in response to climate change impacts, including variability	LDCF	11,000,000	46,100,000
CCA-2 (select)	Outcome 2.1: Increased knowledge and understanding of climate variability and change-induced threats at country level and in targeted vulnerable areas	Output 2.1.1: Risk and vulnerability assessments conducted and updated Output 2.1.2: Systems in place to disseminate timely risk information	LDCF	530,000	1,000,000
CCA-2 (select)	Outcome 2.2: Strengthened adaptive capacity to reduce risks to climate-induced economic losses	Output 2.2.1: Targeted population groups covered by adequate risk reduction measures	LDCF	1,390,000	1,650,000
CCA-2 (select)	Outcome 2.3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	Output 2.3.1: Targeted population groups participating in adaptation and risk reduction awareness activities	LDCF	225,000	550,000
(select) (select)			(Select)		
(select) (select)			(Select)		
(select) (select)			(Select)		
(select) (select)			(Select)		
(select) (select)			(Select)		
(select) (select)	Others		(Select)		
Subtotal:				13,555,000	50,500,000
Program Management Cost ³				345,000	720,000
Total Program Costs				13,900,000	51,220,000

B. PROGRAM RESULT FRAMEWORK

¹ Program ID number will be assigned by GEFSEC.

² Refer to GEF-5 Template Reference Guide posted on the GEF website for description of the FA Results Framework when filling in Table A.

³ This is the cost associated with the unit executing the project on the ground and could be financed out of trust fund or co-financing sources.

Program Goal:

The overall goal of the program is to reduce the vulnerability of vital infrastructure in the Pacific LDCs through the implementation of NAPA priorities. The ultimate impact of the program will be to reduce absolute investments losses from the negative impacts of climate change.

Program Component	Grant Type	Expected Outcomes	Expected Outputs	Type of Trust Fund	Indicative Financing (\$)	Indicative Cofinancing (\$)
1. Enabling Adaptation through improved decision making and knowledge development	TA	1.1 Investment frameworks and decision making methodologies support climate change adaptation	<p>1.1.1 Improved decision making processes critical for budgetary allocations for adaptation in 3 countries</p> <p>1.1.2 Detailed impact and vulnerability information in 3 countries specific to infrastructure needs for water supply and sanitation, transport, and urban planning</p> <p>1.1.3 Revised policies and investment plans to include climate change adaptation in Tuvalu</p> <p>1.1.4 Knowledge products and country/regional information exchange on approaches for strengthening infrastructure resilience and ecosystem based adaptation</p> <p>(CCA-1, CCA-2)</p>	LDCF	633,000	1,525,000
2. Strengthening the climate resilience of infrastructure	Inv	2.1 Strengthened adaptive capacity to reduce losses due to climate change impacts	<p>2.1.2 Vanuatu Port Vila urban drainage and transport plan include climate change adaptation and disaster risk management</p> <p>2.1.3 Implementation sector wide measures to reduce vulnerability of urban water supplies in Timor Leste</p> <p>2.1.4 Upscaling of adaptation strategies to protect roads from damages from climate change in Timor-Leste</p> <p>(CCA-1, CCA-2)</p>	LDCF	11,792,000	46,675,000
3. Reducing	Inv	3.1 Increased	3.1.1 Institutional	LDCF	1,130,000	2,300,000

infrastructure vulnerability through ecosystem based adaptation		deployment of no-regrets risk reduction activities to reduce the vulnerability of infrastructure investments to climate impacts	assessment of barriers to ecosystem based adaptation 3.1.2 Piloting ecosystem based adaptation to protect infrastructure in 3 countries (and linked to Component 2) 3.1.3 Development of green infrastructure guidance materials. (CCA-1, CCA-2)			
	(select)			(Select)		
	(select)			(Select)		
	(select)			(Select)		
	(select)			(Select)		
	(select)			(Select)		
	(select)			(Select)		
	(select)			(Select)		
Subtotal:					13,555,000	50,500,000
Program Management Cost ⁴					345,000	720,000
Total Program Costs					13,900,000	51,220,000

C. INDICATIVE CO-FINANCING FOR THE PROGRAM BY SOURCE AND BY NAME IF AVAILABLE, (\$)

Sources of Co-financing	Name of Co-financier (if known)	Type of Cofinancing	Amount (\$)
GEF Agency	Asian Development Bank	Grant	17,100,000
GEF Agency	Asian Development Bank	Soft Loan	20,000,000
Bilateral Aid Agency (ies)	Australian Aid	Grant	5,000,000
National Government	Timor-Leste	Grant	8,000,000
National Government	Vanuatu	In-kind	500,000
National Government	Tuvalu	Unknown at this stage	20,000
GEF Agency	Asian Development Bank	Grant	600,000
(select)		(select)	
(select)		(select)	
(select)		(select)	
Total Cofinancing			51,220,000

D. GEF/LDCF/SCCF RESOURCES REQUESTED BY AGENCY, FOCAL AREA AND COUNTRY¹

GEF Agency	Type of Trust Fund	Focal Area	Country Name/Global	Program Amount (a)	Agency Fee (b) ²	Total c=a+b
AsDB	LDCF	Climate Change	Timor-Leste	7,600,000	608,000	8,208,000
AsDB	LDCF	Climate Change	Vanuatu	5,750,000	460,000	6,210,000
AsDB	LDCF	Climate Change	Tuvalu	550,000	44,000	594,000
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0

⁴ Same as footnote #3.

(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
Total Grant Resources				13,900,000	1,112,000	15,012,000

¹ In case of a single focal area, single country, single GEF Agency project, and single trust fund project, no need to provide information for this table

² Please indicate fees related to this project.

PART II: PROGRAMATIC JUSTIFICATION

A. GOAL OF THE PROGRAM:

The overall goal of the program is to reduce the vulnerability of vital infrastructure in the Pacific LDCs through the implementation of their NAPAs. The program will assist Pacific LDCs to implement a number of their NAPA priorities in a cost efficient and coordinated manner. Countries will work together to strengthen methodologies relevant to the context of small islands and exchange lessons learning and recommendations in a number of sectors, and at different levels of decision making, such as project, policy and budgeting decisions. This will multiply the benefits which would be achieved by a country by country project approach.

B. DESCRIPTION OF THE CONSISTENCY OF THE PROGRAM WITH:

B.1.1 The [GEF/LDCF/SCCF focal area strategies](#):

The program is consistent with the GEF's Adaptation Strategy to support developing countries to increase resilience to climate change through both immediate and longer- term adaptation measures in development policies, plans, programs, projects and actions. The program will also address an LDCF priority for improved coastal management, with an emphasis on the built environment. Poorly planned, coastal infrastructure can inadvertently increase the vulnerability of the coastline. When an increased risk burden due to climate change is considered however, coastal infrastructure can be adapted to climate change conditions and can help to protect the people and resources essential to their well-being. Further, small island ecosystems are both affected by climate change and, at the same time, healthy functioning ecosystems can help to protect the islands from the impacts of climate change including through the protection of built infrastructure from increased floods, land-slides and erosion. This has been demonstrated during the 2004 Asian tsunami for instance as well as during recent floods in Haiti and neighboring Dominican Republic, which was significantly less impacted. Infrastructure must therefore be planned in the context of its specific environmental conditions, which are changing due to climate change.

The activities under this program will cover water supply and sanitation, transport, urban planning sectors and will assist countries reduce losses in investments that they make today, by planning ahead to a future with a different climate scenario. This is essential to their sustainable development and will offer a wide range of learning opportunities across countries.

Data related to climate change impacts in many Pacific countries is however quite poor, and the many small islands in these countries are geographically and topographically diverse, making even weather forecasting difficult, let alone future climate changes projections. Each country has much to gain therefore in working together to develop indigenous approaches which are specific to the realities in these countries. The region is already vulnerable to climate change, due to its long and often low coastlines and concentration of economic activities in coastal urban areas. Poor planning, poverty and a reliance on natural resource based incomes place the populations at even higher levels of risk.

Component 1. Enabling Adaptation through improved decision-making and knowledge development

This component includes supporting the development and application of *information and decision making tools* which will ensure that future investments take climate change adaptation needs into account. This supports CCA-1 and CCA-2 by mainstreaming and increasing capacity of decision makers to allocate resources appropriately, and with an understanding of sector specific vulnerability. Decisions regarding investments in infrastructure are usually supported by sector planning and investment frameworks. This component will support the integration of climate change adaptation in investment planning in a number of the participating countries. This component may include:

- a) Detailed sector and site specific vulnerability analysis to support adaptation selection
- b) Developing and adapting cost-benefit analysis to selecting the most effective adaptation strategies
- c) Calibrating downscaled climate change projections to a given site and for a given infrastructure design needs
- d) Analyzing adaptation scenarios under different future climates to meet engineering information needs
- e) Supporting investment budgeting processes by prioritizing vulnerability reduction investments, such as in

Tuvalu

- f) Identifying measures to catalyze greater private sector engagement
- g) Regional south-south collaboration for exchanging lessons across sectors
- h) Regional stakeholder workshops for learning and exchange
- g) Development and dissemination of knowledge products
- h) Analysis of previous adaptation projects and programs with a view to providing recommendations to this program and to promote continuous learning.
- i) Training and awareness raising on issues related to climate change vulnerability, impacts and adaptation for the private sector.

Component 2. Strengthening the climate resilience of infrastructure

This component will directly support CCA-1 to *reduce vulnerability of development sectors* in each of the 3 countries, as well as provide some support to CCA-2 by increasing knowledge, adaptive capacity and engagement by stakeholders. The identified sectors coincide with NAPA priorities for each country as well as country agreements with the ADB and will focus on: Water Supply and Sanitation, Urban Planning and Road Transport. The expected sub-projects under this component include:

- a) Implementing sector wide measures to reduce vulnerability of urban water supplies in Timor-Leste
- b) Upscaling of adaptation strategies to protect roads from damages from climate change in Timor-Leste
- c) Integrating climate change adaptation and disaster risk management into urban drainage and transport plans in Port Vila, Vanuatu
- d) Supporting climate resilient infrastructure planning, budgeting and prioritization processes in Tuvalu

Component 3. Reducing vulnerability through green infrastructure

In support of CCA-1 and CCA-2, this component will encourage more integrated infrastructure planning by applying the principles of green infrastructure which is defined here as “*strategically planned and managed networks of natural lands, working landscapes and other open spaces that conserve ecosystem values and functions and provide associated benefits to human populations including the protection of physical infrastructure*”. In some cases, the cost associated with hard infrastructure spending is exorbitant, the future climate risks are too uncertain to justify the spending and the hard infrastructure solutions are not proven to necessarily more effective. Decision makers require some flexibility in these cases to select strategies that provide benefits under uncertain conditions.

However, institutional and knowledge barriers often exist to undertaking this type of more integrated planning. Ministries responsible for infrastructure development are often not aware of the impacts of damaging natural ecosystems for infrastructure construction, such as paving over wetlands or groundwater recharge zones. These activities can increase vulnerability to climate change in terms of reducing the availability of ecosystem services such as coastal protection, erosion control or freshwater recharge for local populations. Conversely, Ministries who are responsible for managing natural resources are often not involved in decisions for infrastructure development, and so they cannot strategically plan conservation and restoration projects to contribute to the protection and provision of resources required by infrastructure Ministries. An *assessment of barriers* such as those mentioned above will bring to light the specific challenges in each country and in the region and suggest ways to overcome them.

This component will also engage targeted populations in implementing activities which contribute to the reduction of floods, erosion, land-slides and coastal erosion through *pilot projects* in the 3 countries. Potential activities under the sub-projects include:

- a) Upstream land stabilization to reduce flash floods which can damage downstream bridges and community settlements
- b) Urban green spaces and natural water retention basins, which reduce local temperatures, improve the stabilization of the hydrologic cycle, and increased water infiltration for groundwater recharge

- c) Increase land cover to reduce erosion and sedimentation which can reduce water availability
- d) Shoreline nourishment and mangrove systems to reduce erosion from increased wave action and storms associated with sea-level rise and increased temperatures

As a third output under this component, *guidance materials* for use by relevant stakeholders will be produced. This will be disseminated through the region and can also be applied by ADB and other donors in future projects to encourage replication. In this regard, ADB's involvement in the Pacific Region Infrastructure Facility (PRIF) – a multi-partner infrastructure coordination and financing facility and the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) – will be particularly important in future up-scaling efforts.

The promotion of programmatic and learning approach from the sub-projects will be supported by dedicated ADB-funded activities to increasing knowledge exchange between countries and sectors, strengthening and adapting locally appropriate methodologies, learning from existing adaptation initiatives and improving on them through the implementation of the program sub-projects. An iterative learning mechanism will be developed to enhance lessons from past and current adaptation projects and programs that will feed into the regional component of the PPCR and PRIF/PCRAFI activities. These activities will provide greater coordination and reflection on adaptation needs between various Ministries within the sub-project countries as well as development partners. In addition, greater private sector involvement will be identified during the project preparation phase to ensure maximization of resources directed towards vulnerability reduction.

B.1.2. For programs funded from LDCF/SCCF: the LDCF/SCCF [eligibility criteria and priorities](#):

The program will assist countries implement their NAPA priorities in a coordinated and mutually supportive way. The priorities identified are urgent as these countries are already experiencing the effects of climate change. Learning between countries will greatly enhance the adaptive capacity of countries for future development planning. Each of the countries in this program have completed and submitted their National Adaptation Programme of Action (NAPA) to the UN Framework Convention on Climate Change, and are thus also signatories to the Convention.

The proposed sub-projects will finance the additional costs associated with designing and planning for infrastructure which will withstand the impacts of climate change as well as ensure that the built environment does not inadvertently increase vulnerability to climate change by, for example, reducing groundwater recharge zones by building impermeable surfaces. The additional costs associated with infrastructure changes can be quite high. In ADB's previous experiences however, there are a number of adaptation solutions and those which are most cost effective must be selected. The rationale and impact data for future climate changes is rarely sufficient to justify very high costs infrastructure adjustments.

The proposed program is also consistent with priority sectors identified by the NAPAs, primarily those related to infrastructure, but also to water resources; disaster preparedness; infrastructure; natural resource management and coastal zone management. It also contributes to efforts to greatly expand the impact of the LDCF projects by associating NAPA implementation with sector-wide efforts in the region.

B.2. National strategies and plans or reports and assessments under relevant conventions, if applicable, i.e. NAPAs, NAPs, NBSAPs, national communications, TNAs, NIPs, PRSPs, NPFE, etc.:

Since the early 1990s, Pacific countries have articulated their priorities for addressing climate change at a regional level and in 2007 the Pacific Islands Forum Leaders reiterated their deep concern over this serious and growing threat to the economic, social and environmental well being of Pacific Island Countries and Territories (PICTs), their communities, peoples and cultures. In order to seek further concrete actions at the national, regional and international levels, the PICTs have developed an action plan to implement the Pacific Islands Framework for Action on Climate Change (2006-2015). The plan targets adaptation measures to the adverse effects of climate change that should be developed and implemented at all levels including:

1. Identification of vulnerable priority areas/sectors and appropriate adaptation measures using available and appropriate information recognizing that such information may be incomplete.

2. Adaptation measures in vulnerable priority areas supported by existing data sets and traditional knowledge, or new data developed in some instances as necessary.
3. Appropriate adaptation measures integrated into national/sectoral sustainable development strategies or their equivalent and linked to the budgeting process.

The program is also directly relevant to the countries' following NAPA priorities:

Timor-Leste NAPA Priorities:

Priority #2. Water Resources: Promotion of Integrated Water Resource Management (IWRM) to guarantee water access for food production, sanitary uses, ecosystems and industry development. This includes: 1. building climate proofed and environmentally sustainable infrastructure to protect water sources (springs, streams, wells, etc.), 2. providing safe water supply during climate change extreme event periods, 3. enhanced Government and community strategies on responding to drought exacerbated by climate change and, 4. the creation and enhancement of water harvesting models (capture and storage) and water distribution system as well as management system at all levels to avoid water shortage due to climate change.

Priority #7: Physical Infrastructure: Improved Regulations and Standards for Climate-resilient Infrastructure, including: 1. review of existing laws, regulations and standards to enhance CC-resilience of critical infrastructure and 2. passing new legislation to strengthen and guarantee national development through improved regulation of the quality of materials, adapted building codes and practices and law enforcement.

The proposed program will evaluate and finance the additional costs of protecting roads which run along highly vulnerable mountainous ecosystems and coastal low-lands. In addition, the program will support the introduction of comprehensive integrated water resource management, including climate change impacts, in the urban areas of Dili, Manatuto and Pante Makassar. A number of areas can be examined to reduce immediate and long-term vulnerability of water resources such as planning and operating water sector programs to ensure sustainability of ground-water resources, increasing water efficiency, strengthening maintenance especially during floods and droughts, and designing water supply and sanitation systems to operate under greater climate variations. Budget support is increasingly being used as the financing model in Timor-Leste and there is also opportunity to test this approach through this program.

UNDP is currently working with the GoTL to implement the first NAPA implementation project, "Strengthening the Resilience of Small Scale Rural Infrastructure and Local Government Systems to Climatic Variability and Risk", to be financed from the LDCF. The ProDoc identified 3 major components for: i) systematic use of climate risk information, with a focus on rural water, and integration into development frameworks; ii) inclusive planning and budgeting for reducing climate and natural disaster related risks; and iii) physical investment for reducing climate risks. The proposed interventions would benefit policy makers, local administrators and rural communities. While the focus of the UNDP supported project is on small-scale rural infrastructure, the proposed ADB programme focuses on support to large-scale infrastructure for: i) district capital water supply; and ii) road network upgrading. The approaches taken are complimentary in that they consider both infrastructural and ecosystem based adaptation strategies for reducing vulnerability. Also, both projects consider information needs and policy integration as important entry points for fully addressing the issues. The UNDP supported project will focus on strengthening the role of the Ministry of Economy and Development (MED) as the main coordinating arm of government on climate change issues building on its lead role in implementing the NAPA process. At the subnational level it will help to integrate climate risk measures into local planning and budgeting processes, including the use of district and sub-district level vulnerability assessment as a key planning tool, working through the Ministry of State Administration and Territorial Management.

UNDP is also working with GoTL to process a second LDCF project entitled "Strengthening Community Resilience to Climate Induced Natural Disasters in the Dili to Ainaro Road Development Corridor, Timor Leste". The project will support implementation of Timor-Leste's NAPA priorities and is specifically linked with Disaster Management, Physical Infrastructure and National Institutional Capacity (Priority 4: Natural Disasters; Priority 5: Forests, Biodiversity and Coastal Ecosystem Resilience; Priority 7: Physical Infrastructure; and Priority 9: National Institutional Capacity). The project's expected outcomes are: (i) strengthened adaptive capacity to reduce risks to

climate-induced economic losses; and (ii) strengthened awareness and ownership of adaptation and climate risk reduction processes at local level. The project's PIF explicitly refers to opportunities to develop complementarity with the current project during its Project Preparation phase. It is anticipated that these complementarities will focus on the application of common risk assessment and appraisal approaches, training/capacity building opportunities and on-ground climate proofing methods.

The ADB supported project will also focus on national level entry points, and in some cases District level, but specifically from an infrastructure sector perspective. While maintaining this sectoral approach, the ADB project will also reinforce the central role being played by MED in climate change coordination, including its convening of a platform for national dialogue and information sharing. This recognizes the need to ensure consistency in approaches promoted from the local to national levels of intervention; and the need to ensure effective coordination to avoid overstressing limited national human resource capacities. In addition, as site selection becomes clearer during the project preparation phases of both projects, overlap will be avoided through ongoing coordination between agencies. The level of vulnerability and need are significant enough in the country that overlap of projects can easily be avoided. Opportunities for cost effectiveness in terms of joint efforts will also be identified. These issues will be fully assessed during the PPG phase. Further, broader level donor coordination on climate change in the country is established through a donor coordination group for climate change which will be a channel for continued discussions on all climate change projects, including those in question above.

Vanuatu NAPA Priorities:

Priority #2. Water management policies/programmes (including rainwater harvesting) - reducing vulnerability to the anticipated impacts from climate change on the country's water resources.

Priority #5. Mainstream climate change considerations into infrastructure design and planning (modern & traditional, EIA)

The proposed program will support the above noted NAPA priorities through the Port Vila and Luganville Urban Development project (PUDP), particularly focused on urban drainage and sanitation services. These will contribute to implementing both Priorities #2 and #5. Flooding in Port Vila occurs naturally but is highly exacerbated by man-made factors. In addition however, increasing frequency of larger storms is likely making the situation worse. In a recent study completed by ADB, 8 water catchment areas have been identified as being highly affected by climate change. The increase in floods and sea-level rise is compounded by an increase in droughts, as rainfall also decreases during the dry season. These additional stressors on urban livelihoods will be addressed through this program.

The World Bank is currently working with the Vanuatu Meteorological Service to prepare the first NAPA implementation project entitled "Increasing Resilience to Climate Change and Natural Hazards in Vanuatu". The project will aim to strengthen climate resilience and disaster risk reduction in key sectors in Vanuatu by promoting a risk management approach to reduce vulnerabilities.

While the World Bank project focuses on developing more general climate change adaptation and disaster reduction guidelines, to be used by all sectors, the proposed ADB sub-project under this program is starting from the perspective of integrated urban planning, and strengthening those sector practices to include consideration of climate change risks. These are two different but complimentary approaches which will need to be coordinated. Another area of potential overlap related to data creation and dissemination. Further, while the World Bank will work with the Meteorological Service to strengthen information delivery, the proposed ADB sub-project will work from the side of the data and information users – to better identify what the data needs are in urban planning; and to strengthen the capacity to use this data to improve planning. Both are necessary and coordination will continue through the development and delivery of this program.

The UNDP is also in the Project Preparation Phase of the LDCF project entitled "Adaptation to Climate Change in the Coastal Zone" to support coastal zone management in Vanuatu, including community level interventions, early warning systems, strengthened governance and knowledge management. The project aims to address three of eleven priorities identified in the NAPA (i) community based marine resources management; (ii) ICM; and (iii) mainstreaming climate change into policy and national planning. The objective of the coastal zone adaptation project

is “to improve the resilience of the coastal zone to the impacts of climate change in order to sustain livelihoods, food production and preserve and improve the quality of life in targeted vulnerable areas” through four components: (i) integrated community approaches to climate change adaptation; (ii) information and early warning systems on coastal hazards; (iii) climate change governance; and (iv) knowledge management. The seven proposed project sites are spread throughout Vanuatu at the village level outside of the country’s urban centers. The Adaptation to Climate Change in the Coastal Zone project is highly complimentary with the current proposal, given its focus on smaller communities and on community-based adaptation. There will be important synergies between the projects especially through activities on infrastructure planning and climate proofing – with the UNDP led project concentrating on small-scale transport infrastructure and a community level and the current proposal concentrating on urban infrastructure and planning.

Tuvalu NAPA Priorities:

NAPA Priority #1. Increasing resilience of Coastal Areas and Community Settlement to climate change.

The proposed program will support Tuvalu to protect its coastal communities and infrastructure by directing investments towards projects which reduce vulnerability to climate change, particularly to sea-level rise and associated storms and impacts. In preparing its NAPA, the government identified a number of barriers to protecting coastal communities such as lack of building codes and norms for infrastructure. This is in addition to overall environmental degradation which makes the coast even more vulnerable. The project will work at the highest levels of government to effect significant changes to decision making and budgeting process in light of climate change priorities.

Two full-sized LDCF financed project are currently under implementation through UNDP and the Ministry of Foreign Affairs, Trade, Tourism, Environment & Labour. The first LDCF project aims to “increase the protection of livelihoods in coastal areas in all inhabited islands of Tuvalu from dynamic risks related to climate change and climate variability.” The project focused on community based pilot projects and capacity development. As is the case with most LDCF project coordination, the proposal also works on data dissemination and knowledge sharing, which will need to be coordinated. The second LDCF NAPA implementation project also takes a community development perspective. The project aims to build the “resilience of island communities to climate change variability and risks is strengthened through participatory island-level planning, budgeting and execution and community-led investments”. Component 3 under this program will support “inclusive local planning, budgeting and budget execution for strengthened climate resilience” with an expected outcome of “enhanced capacity of communities to access internal/external financing for community-based climate change adaptation through existing participatory development planning processes”. The project will achieve this outcome by concentrating on supporting Outer Island planning and budgeting processes to integrate climate change issues while, in parallel, strengthening national capacity for managing climate change adaptation investments in government planning and budgeting processes. The proposed project has the potential to be highly complimentary with the two NAPA implementation projects. However, there is the potential for dis-alignment and contradiction if the LDCF projects are not well coordinated and this will be prioritized during the development and implementation of this program.

Regional support and coordination:

Finally, the landscape for NAPA implementation projects in all LDCs is becoming increasingly complex, and areas for overlap, particularly in the subject matters of knowledge, data and policy development are increasing. A suite of regional activities are being proposed under this program funded through internal ADB resources and through integration with ADB-led regional climate change adaptation projects and are expected to provide parallel co-finance for GEF of up to US\$600,000. These activities will focus on these issues to ensure that sufficient attention is given to coordination and harmonization between NAPA projects underway and being planned. This will be undertaken through the facilitation of information exchange, particularly on common challenges, lessons and demonstration activities and the production and dissemination of targeted knowledge products between the 3 countries and across the region through linkage with other ongoing and planned programs.

C. Rationale of the program and description of strategic approach (including description of current barriers to achieve the stated objectives):

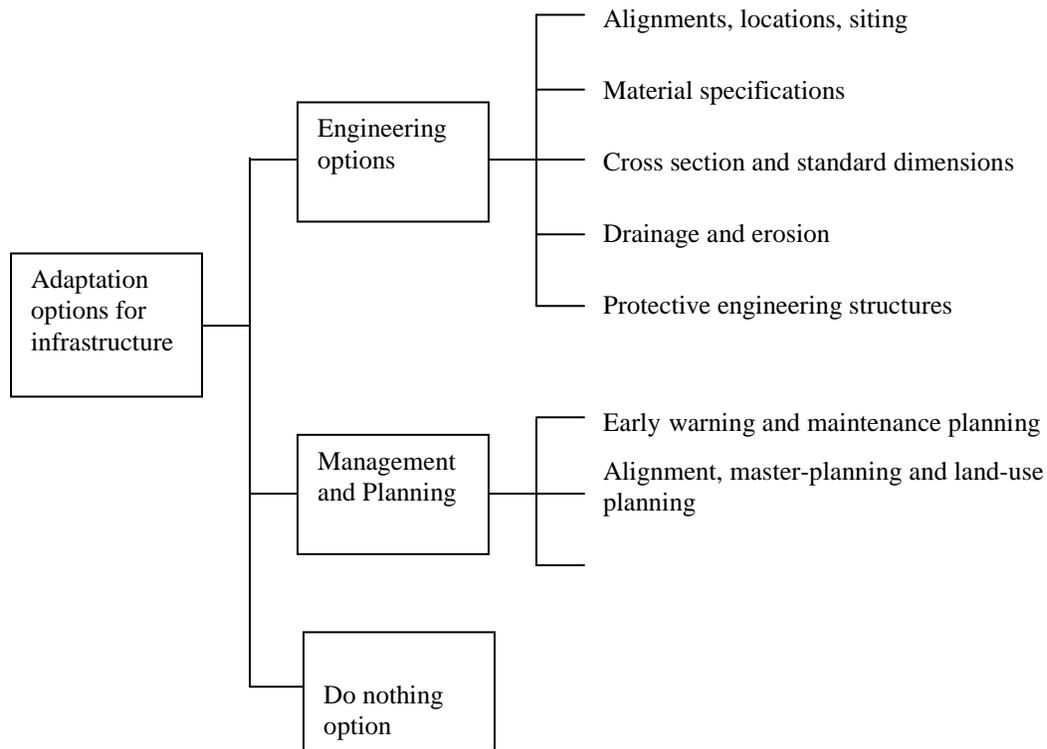


Figure 1 Nature of adaptation options for protecting infrastructure

C.1 Rationale and Barriers to climate-resilience

Rationale and Strategic Approach

Previous experience and work at ADB to climate proof existing and new infrastructure suggests that there are three sets of options in the case of climate proofing a given infrastructure. As Figure 1 below illustrates, these generally include: engineering options; management and planning; and, opting not to invest in protecting a given asset. In the last case, it is sometimes found that it is more cost effective to allow for a given asset to deteriorate than to attempt to rehabilitate, strengthen and maintain it. The intervention may then sometimes be socio-economic, such as human migration or changes in economic activities.

A limiting factor for decision makers in selecting the most cost effective adaptation option in many cases is imperfect information. The data are not available to justify a given additional expense, such as the additional costs involved in raising the level of a road or realigning a coastal road away from a shoreline in light of projected but uncertain changes in sea-level. This is indeed the case in the Pacific Islands where data is often not at the resolution or reliability required to support analysis techniques such as climate modeling or cost benefit analysis. However, it is recognized that this should not be a reason not to take actions to adapt. We can work however to continually improve the information available, to develop appropriate support tools to accompany adaptation decision makers, and to implement win-win approaches. Some piloting and testing of more costly approaches, or calculated risks, can also be appropriate to draw lessons.

Adaptation through management and planning, option 2 in Figure 1 below, is often selected because it is lower cost, provide numerous co-benefits and rarely have unanticipated negative effects. Ecosystem based approaches to strengthening the resilience of infrastructure and communities is also an important option to consider, however

further experience needs to be developed and institutional barriers need to be carefully considered and addressed.

Country Level Strategic Approach and Barriers to achieving climate resilience

Timor-Leste:

Taking into account the potential for changes in terms of increased air temperature, change in rainfall patterns and intensity and in frequency and strength of storm activity, stakeholders consulted in the development of the NAPA expressed concern that climate change poses further obstacles to the development of the nation's infrastructure. Particular concern was expressed for coastal infrastructure as set out in the table below are represent barriers to achieving the program objective.

The geography of the country is itself a challenge to vulnerability reduction because it is highly mountainous, has young and easily erodible soils and a long coastline where much development is taking place. Future plans in the country foresee significant investment in infrastructure – roads, ports, airports, communications and electricity, and this development is not always taking place with an environmental perspective. At the same time oil and gas has become an important sector for Timor-Leste and is a driving force for development and is seen as the platform from which major economic development can be achieved in the coming years. This infrastructure is mainly located at sea and it too is vulnerable to climate change. This will be difficult to steer through an adaptation program such as this and so raising awareness and institutional coordination will be important to ensure that other infrastructure developments, outside of the scope of this project, are developed sustainably.

Water supply, and in particular lack of water in the dry season, is the most important environmental constraint on agricultural production. Farmers identify rainfall and water availability as the two principal environmental constraints on production. Communities face dwindling access to water during the dry season when the largely natural springs that they rely on may reduce considerably in flow or cease altogether. Groundwater resources, which exist in abundance in some areas, remain largely unexploited. Climate change could result in an increased amount of rain received throughout the year. However, the wet season may be slightly drier and the dry season may be slightly wetter. Rainfall may come in the form of fewer but more intense events. El Nino events which result in delayed rain and less rain may become more severe. Uncertainty about future water availability will pose a challenge to the implementation of this program and risk management approaches will be applied to ensure rationale use of resources and decisions.

The expected barriers to reducing vulnerability in the expected project area include, for one, lack of data required by most engineering methods. Some climate change downscaling has been conducted but with the high variability in the Timorese mountainous landscape, the level of accuracy needed is difficult to come by. This project may seek to strengthen available data but will also examine and agree to a set of agreed assumptions to guide decision making. For instance, it can be assumed that coastal areas below 2 metres above sea level will be increasingly vulnerable to sea-level rise and a safety factor will be applied to planned works in those areas or, maintenance budgets can be increased in anticipation in more frequent damage. Realignment is often an option but in Timor-Leste it is difficult because of the rise of the mountains soon after the coastline.

In the case of the water sector, lack of information is one of the most evident challenges – not only about climate change but also even of existing resources, such as groundwater. Water extraction projects are proceeding without adequate knowledge of the water yield, including on how that will change in the dry and wet seasons. Water distribution between the dry and wet seasons is another barrier, with either extended drought periods or flood periods. The program will seek adaptation solutions to improve the distribution and efficiency of the water management approaches.

Vanuatu:

Much of the infrastructure, including the main commercial centres of Port Vila and Luganville, is located on the perimeter of the major islands. These centres are only a few metres above sea level. Moreover, much of the road network is also situated on the perimeter of the islands. The infrastructure and other fixed assets are extremely vulnerable to cyclone and, storm surges. These areas will be affected by even small increases in sea levels due to the larger surges associated with increased frequency and intensity of tropical cyclones. Enhanced human activities in the coastal areas, including sand extraction and mangrove and other coastal vegetation removal has increased the sensitivity of these important coastal buffers to climate and sea level variations. This is due to either a lack of enforcement of existing legislation or because of ignorance and the lack of proper management systems. The existing infrastructure is already highly vulnerable to sea level rise and the costs associated to protecting it might be exorbitant. This will be examined during project design and options for adaptation discussed with relevant decision makers.

Some of the expected technical barriers which this program will seek to address include physical obstacles, such as adjusting drainage and sanitation infrastructure so that it can operate effectively under the impacts of climate change which are likely to include increased siltation into the systems, tide locking, due in part to sea level rise, and erosion and damage due to increased rainfall intensity.

Tuvalu:

In the last decades significant infrastructure developments have taken place, particularly building facilities on Funafuti such as the Central Princess Margaret Hospital, the Vaiaku Lagi Hotel, the Central Government Office and Nauti Primary School Classrooms. Replicas of the later have also been duplicated on some of the outer islands. In addition, road infrastructure has been put in place which has increased connectivity of rural communities with the main settlement and urban center. The cost for construction and maintenance of these infrastructures is already very high, also because of the lack of adequate local construction expertise to maintain these. Because the sub-project in Tuvalu focuses on the policy level, this will not pose a specific challenge to achieving the program outcomes. Tuvalu is further concerned by the increased maintenance costs of infrastructure as a result of their vulnerability to climate change. These barriers to adaptation are made worse by indiscriminate building in the private sector and lack of a national building code (currently approved in principle), which highlights the fact that most of the private residential and private sector buildings are vulnerable to extreme events as they are often inappropriately located and designed. This poses a challenge to the implementation of the program objectives and engagement of the private sector may help to mediate this challenge.

D. Discuss the added value of the program vis-à-vis a project approach (including [cost effectiveness](#)):

Guided by ADB's Pacific Approach, 2010–2014, a programmatic approach for the LDCs in the region will reinforce both ADB-Government agreed Country Programming Strategies (CPSs), NAPA implementation, national economic growth, and poverty reduction in a cost-effective manner. Regional assistance brings the additional benefits of sharing experiences and peer support for implementation. The governments recognize that regional assistance can be a cost-effective and efficient way to address common problems and issues, such as lack of human and technical capacity.

Given the small scale of the ADB's country programs in these countries, as compared to other Asian countries, regional activities are a cost-effective way to provide additional support to achieving country partnership objectives and reinforcing adaptation objectives in these countries. Such regional support allows Pacific governments to prioritize strengthening core government functions. This is reflected in ADB's programming in the region.

The programmatic approach proposed in this PFD also allows for sharing knowledge across sectors and between countries, which face similar challenges in terms of infrastructure development and maintenance. A number of adaptation activities across four sectors, namely water supply and sanitation, transport, urban development and energy will generate lessons which will be shared across the five participating countries. This provides a forum for inter-sectoral coordination and solutions development. Channels for sector knowledge groups, such as transport

forums and Pacific Infrastructure Advisory groups will be targeted to ensure that adaptation is further integrated into sector based planning decisions. The Pacific Region Infrastructure Facility (PRIF), for example, is a multi-partner infrastructure coordination and financing mechanism that will be involved in this program and works with the countries' infrastructure planning and financing, as well as donor communities, including ADB. This will provide a channel for greater access to sector experts in each country and for learning across sectors and countries.

Because this is a Pacific regional program, it also allows to more directly build on other regional programs. For instance, three regional Technical Assistance projects being undertaken by ADB in particular are expected to directly support a regional approach to NAPA implementation for these countries: (i) Strengthening Governance and Accountability in Pacific Island Countries, Phase II, which will provide subregional audit support to public auditing in Kiribati, Nauru, and Tuvalu; (ii) Pacific Economic Management to support countries in addressing the impacts of the global financial and economic crisis; and (iii) Strengthening Capacity of Pacific Developing Countries in Climate Change.

Further, through the Pilot Program on Climate Resilience (PPCR), ADB is developing a regional program, including a knowledge platform for sharing lessons on adaptation. The countries involved are Papua New Guinea, Samoa and Tonga. A complimentary model for sharing knowledge between the proposed regional LDCF program and the PPCR regional program will be established, which will have benefits in terms of cost reductions and an increased level of outreach across the Pacific. Similarly, regional knowledge sharing will be enhanced through harmonization with the Strengthening Disaster and Climate Risk Resilience in Urban Development in the Pacific (Financed by the Japan Fund for Poverty Reduction) project coordinated through the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI).

The regional programmatic approach being proposed here also allows for better coordination with other regional programs and centres in the region and will add value beyond what would be achievable to the country scale alone. This will include linkage with programs such as the EU funded "Increasing Climate Resilience of Pacific Islands Small Island States through the Global Climate Change Alliance", the GEF funded Pacific Alliance of Sustainability Program, and the Secretariat of the Pacific Regional Environment Program (SPREP). In addition, ADB is also cooperating with the Australian government's Pacific climate change science program (PCCSP Climate Futures) which assists decision makers and planners in 15 partner countries of the Asia-Pacific region in understanding how their climate has changed and how it may change in the future. These together with ADB's Inventory of Coastal Infrastructure in the Pacific, provide a solid regional basis on which to consider climate hazards and build resilience and capacities.

E. Describe the baseline program and the problem that it seeks to address:

The proposed program is consistent with ADB's Pacific Approach 2013-2015 to foster connectivity, consensus, and a greater community through: 1. Inclusive and Environmentally Sustainable Growth 2. Good Governance and 3. Regional Cooperation and Integration. In achieving this sustained and resilient development in the region, climate change adaptation as well as mitigation are stated change drivers and as such is a high priority for ADB's Pacific program. The operational sectors of focus also include those which are proposed as part of this program. Namely, transport, energy and urban development including water supply and sanitation. These priorities have been agreed to through on-going dialogue with each country and based also on ADB's added value.

Greater sharing of regionally provided facilities and services, for example, in education, auditing and air safety together with greater regional integration, including private investments in aviation and telecommunications, have all strengthened national capacities. Many of ADB's baseline programs consider regional and programmatic approaches as an effective and efficient way of promoting development in the region. While a number of efforts are being made to integrate adaptation into each project and program, resources are limited and the needs are increasing for testing innovative approaches in adaptation. These adaptation exercises have also tended to be on a project by project basis in individual countries. There is an opportunity to capture lessons from those projects in order to improve on them and share them between sector and countries facing similar challenges. The proposed GEF program will also foster greater coordination across countries and regions with a view to achieving adaptation at a greater scale.

Country level baseline programs

Timor-Leste

The government's priority actions in infrastructure include (i) the rehabilitation or upgrade of all national and district roads by 2020, and rehabilitation of all rural roads by 2015; (ii) the provision of access to clean water and improved sanitation for all by 2030; (iii) the establishment of new port facilities in Dili and on the south coast by 2020; (iv) the upgrade of the national airport and rehabilitation of district airports by 2015; (v) the provision of electricity to all by 2015; and (vi) a competitive telecommunications market and comprehensive mobile phone and internet coverage by 2015. The proposed LDCF program will be in support of the government's first two priorities for infrastructure.

ADB support for road transport will continue for a long-term approach to the rehabilitation, upgrading, and maintenance of the core road network. The emphasis will be on investment projects that are of national significance and provide an inclusive pattern of economic growth, particularly by improving the transport links needed by agriculture and the rural economy. Support for road maintenance, strengthening government agencies and their staff, and national and community-based contractors will remain priorities. Road safety and public transport will receive increased attention. The ADB transport program will progress from support of the rehabilitation of roads to the upgrade of key roads. The expected project *outcome* will be a more reliable and safer road network provided by the Ministry of Public Works. The project *outputs* are: (i) upgrade and climate-proof national roads. About 117 km of roads will be upgraded to a climate-resilient standard including priority roads of 81 km from Manatuto to Natarbora.; (ii) Prepare detailed designs for future priority road links. Detailed engineering design and social and environmental due diligence will be prepared for about 169 km of national roads; (iii) expand performance-based road maintenance. The civil works contractors will maintain the upgraded road sections for 2 years after physical completion. Local contractors will be trained in performance maintenance, and performance-based contracts will be used for future maintenance; (iv) generate awareness of road safety and transport-related social issues. A community-based road safety awareness program, including education for schools, drivers, road users, communities, and HIV/AIDS prevention will be carried out. A multiyear national road safety action plan will be initiated; and (v) provide project management support.

In terms of Water supply and sanitation, support will remain focused on improving water supply and sanitation services in urban centers. Investment projects will provide for the rehabilitation and warranted upgrade of systems, and support to ensure the sustainable management of these systems. Support will extend, where feasible, to facilitating the entry of private sector operators through Public Private Partnerships. ADB will help address priority needs in rural areas when resources are not available from other development partners. The creation of technically, financially, and environmentally sustainable services will be central to ADB's assistance to the water supply and sanitation sector.

ADB support will remain focused on improving the delivery of water supply and sanitation services to urban centers such as Dili, Manatuto and Pante Makassar. This will extend to facilitating the engagement of the private sector in water supply and sanitation via public-private partnerships. ADB will help address high-priority water supply issues in rural areas when resources are not available from other development partners. The creation of technically, financially, and environmentally sustainable services will be central to ADB assistance to water supply and sanitation. ADB assistance will emphasize women's involvement to address gender issues in project design and community-level maintenance for the sustainability of water supply and sanitation systems.

The planned project *outcome* is for the Nationale Directorate for Water Supply and Sanitation (NDWSS) to provide safe and reliable water supply to district capitals Manatuto and Pante Macasar. The planned *outputs* include: (i) NDWSS rehabilitates and expands Manatuto and Pante Macasar water supply systems; (ii) Households in Manatuto and Pante Macasar have increased knowledge of efficient use of water resources and safe hygiene practices; (iii) Sustainable Operations and Maintenance of water systems practiced by District Directorates (DDWSS) in district capitals; (iv) Sustainably secured water resources in Lake Lehumo; and (v) the Ministry of Infrastructure, District and National Directorates (DNWSS), and DNRBFC provide efficient project management and monitoring services.

Table 3. Timor-Leste Baseline Projects and NAPA priorities

ADB baseline Project* and Planned Outcome	Year	Sector	EA	Total expected baseline financing	Related NAPA Priority and problem it will seek to address
1. District Capital Water Supply Project (Subject to additional Financing)	2012	Water Supply and Sanitation	Ministry of Infrastructure	6.00 million, subject to financing	<i>NAPA Priority #2. Water Resources: Promotion of Integrated Water Resource Management (IWRM)</i> <i>NAPA Priority #7: Physical Infrastructure: Improved Regulations and Standards for Climate-resilient Infrastructure</i>
<i>Baseline Project Planned Outcome:</i> to provide safe and reliable water supply to district capitals Manatuto and Pante Macasar. ADB and government plan to expand the project in 2013 with additional finance to include other districts, possibly Dili, Baucau, and/or Suai.				<i>The problem the NAPA project will seek to address:</i> Initial identification of potential climate change impacts in the project area include: Unreliable water supply as rainfall patterns become more variable; Changes in flood return periods put pressure on physical infrastructure; Public water demands increase during extended drought periods; and disruption of service during storms and extreme events. (Note: See section F for more detailed analysis of vulnerabilities and potential adaptation solutions.)	
2. Road Network Upgrading Sector Project	2012	Transport	Ministry of Transport	39.00 million	<i>NAPA Priority #7: Physical Infrastructure: Improved Regulations and Standards for Climate-resilient Infrastructure</i>
<i>Baseline Project Planned Outcome:</i> To facilitate access to social and economic facilities in the project areas, improve the efficiency of cross-border activities, reduce travel time and costs, and make the road network less vulnerable to severe climate.				<i>The problem the NAPA project will seek to address:</i> The road network is particularly vulnerable as the country has a long coastline in addition to being highly mountainous. Road construction and maintenance needs to be reinforced to manage increased erosion and flooding of coastal and mountain roads. (Note: See section F for more detailed analysis of vulnerabilities and potential adaptation solutions.)	

Vanuatu

Port Vila (population approximately 42,000) and Luganville (population approximately 15,000) are the two main urban centers. They are the main centers of economic growth and development in Vanuatu. Squatter and informal settlements started to develop in and around Port Vila in the early 1960s, and some 30%–40% of the urban population now lives in these areas. Based on current demographic trends, the population of informal settlements in the peri-urban areas around Port Vila and Luganville could reach 19,000 by 2010.²⁵ Legislative and regulatory structures for planning and development in Port Vila involve a number of ministries and local government agencies and overlapping responsibilities, capacity gaps, and fiscal authority need to be addressed.

The first phase of Port Vila Urban Development Project (PVUDP) for total US\$39.1 million (US\$5 million ADF loan, US\$31 million grant financing from Australian Aid Program, and US\$3.1 million Government's financing) was approved in December 2011. PVUDP will contribute to economic growth by improving drainage, roads and sanitation systems in greater Port Vila (municipality and adjacent urban and peri-urban areas in the Shefa province). The Project will implement the recommendations of the drainage and sanitation master plan prepared through a project preparatory technical assistance (PPTA) which identified priority interventions for improved access to, and delivery of drainage and sanitation services to the residents of Port Vila. There are also plans to design a phase II

project to develop urban infrastructure in the remaining areas of Port Vila and extend the coverage to Luganville. The specific outcomes and outputs for the second phase of the project have not yet been developed.

Table 4. Vanuatu Baseline Projects and NAPA priorities

ADB baseline Project* and Planned Outcome	Year	Sector	EA	Total expected baseline financing	Related NAPA Priority and problem it will seek to address
Urban Development Project, Phase II Greater Port Vila and Luganville	2013	Urban Development	Department of Public Works	6.00 million implementation	NAPA Priority #2. Water management policies/programmes (including rainwater harvesting) NAPA Priority #5. Mainstream climate change considerations into infrastructure design and planning (modern & traditional, EIA)
<i>Baseline Project Planned Outcome:</i> The project will contribute to economic growth by improving drainage, roads and sanitation systems in greater Port Vila (municipality and adjacent urban and peri-urban areas in the Shefa province).				<i>The problem the NAPA project will seek to address:</i> An initial assessment identified that 8 water catchment areas affecting the city are highly vulnerable to climate change. An increase in floods and sea-level rise is compounded by an increase in droughts, as rainfall also decreases during the dry season. These additional stressors on urban livelihoods will be addressed through this program. An initial assessment has identified the following expected problems for the project site: Accumulation of higher amounts of silt and debris in drains from increase rainfall intensity; Increasing occurrence of tide locking, due in part to sea level rise; and overflow of sanitation from flooding. (Note: See section F for more detailed analysis of vulnerabilities and potential adaptation solutions.)	

Tuvalu

ADB does not currently have planned “hard” infrastructure projects in Tuvalu. However, the government has expressed interest in participating in this program for support to address their urgent and immediate adaptation needs. In particular, sub-project will support achievement of the Tuvalu National Strategic Action Plan for Climate Change and Disaster Risk Management (2012–2016) and specifically Goal 4: Developing and maintaining Tuvalu’s infrastructure to withstand climate change impacts, climate variability, disaster risks and climate change projection.

The sub-project for Tuvalu will therefore be fairly innovative in that it will seek to incorporate adaptation into broader infrastructure planning, prioritization and budgeting process. It is at these earliest stages that very profound changes can be made to how infrastructure is planned, by, for example, ensuring that building codes and land zoning is appropriate to projected sea-level rise, in the case of small islands such as Tuvalu. Tuvalu’s first NAPA priority relates to coastal zone protection. In identifying their vulnerabilities for this priority, they identified the high level of vulnerability of coastal infrastructure as important to communities which are largely concentrated along the coastal zone.

The baseline project for Tuvalu will therefore be through the Pacific Region Infrastructure Facility (PRIF), which is a multi-partner infrastructure coordination and financing mechanism. It was initiated in 2008 by the Asian Development Bank (ADB), the Australian Aid Program (AAP), the New Zealand Government via the New Zealand Aid Programme (NZMFAT), and the World Bank Group (WBG). The European Commission (EC) and the European

Investment Bank (EIB) became members of the joint initiative in 2010.

The PRIF has recently supported Tuvalu to prepare an Infrastructure Strategy and Investment Plan (TISIP), which assists the central government to identify, prioritize and budget for key infrastructure projects, and is prepared iteratively. The *objective* of the work is to embed climate change adaptation activities within the Government's needs, strategies, policies, and immediate priorities in the infrastructure sector (as identified in the TISIP) as well as identify the financial resources to support their realization. The immediate *output* will be an Annex to the TISIP that provides focus on required climate change adaptation investments to build resilience within infrastructure planning and operation. PRIF management has confirmed support for this project and together with the government of Tuvalu believe it to be fundamental to directing future investments towards reducing vulnerability to climate change.

Table 5. Tuvalu Baseline Projects and NAPA priorities

ADB baseline Project* and Planned Outcome	Year	Sector	EA	Total expected baseline financing	Related NAPA Priority and problem it will seek to address
1. Infrastructure Strategy and Investment Plan	2013	Water Supply and Sanitation	Department of Planning and Budget, Ministry of Finance and Economic Development (MFED)	220,000	NAPA Priority #1. Increasing resilience of Coastal Areas and Community Settlement to climate change.
<i>Baseline Project Planned Outcome:</i> The objective of the work is to identify the Government's needs, strategies, policies, and immediate priorities in the infrastructure sector as well as identify the financial resources to support their realization.				<i>The problem the NAPA project will seek to address:</i> Most of the country's population and infrastructure is concentrated along the coastline. Large scale planning of settlements and supporting infrastructure such as buildings, roads and water supply and sanitation do not consider the increased vulnerability of these areas. This LDCF project will strengthen high level planning to contribute to reducing resilience of coastal areas and communities. The project is multi-sectoral. (Note: See section F for more detailed analysis of vulnerabilities and potential adaptation solutions.)	

F. Incremental /Additional cost reasoning: describe the incremental (GEF Trust Fund) or additional (LDCF/SCCF) activities requested for GEF/LDCF/SCCF financing and the associated global environmental benefits (GEF Trust Fund) or associated adaptation benefits (LDCF/SCCF) to be delivered by the project:

The baseline program covers the water supply and sanitation, road transport, and urban planning sectors. The following is an initial description of the specific vulnerabilities in each sector. The following section (F.2), describes that additional adaptation activities to be financed through this program and the associated adaptation benefits. Clearly, as vulnerabilities and adaptation is site specific, these will be narrowed down during the preparation of the sub-projects. Descriptions of the country sub-projects are included in Annex 1.

F.1 Sector Specific Vulnerabilities that the GEF Project will seek to address

Expected Climate Change Impacts on Water Supply and Sanitation (Timor-Leste, Vanuatu and Tuvalu):

The proposed sub-projects which are related to Water Supply and Sanitation are in Timor-Leste, Vanuatu and Tuvalu.

While a detailed analysis will be needed to identify specific vulnerabilities in each sub-project area, below is a description of how these sectors have generally been found to be affected by climate change.

Changes to temperature and precipitation patterns:

- Temperature increases and changes in the seasonality of precipitation may result in a reduction of water availability.
- Increased sediment load may also result in rapid sedimentation of water reservoirs, causing reduced storage capacity.
- Changes in the amount of rainfall may affect the performance and operation of water systems; increases in precipitation may put pressure on urban drainage systems, whereas sewerage systems may become more difficult to operate and maintain as precipitation levels decline.
- Long-term rainfall increases may raise groundwater levels, decreasing the efficiency of natural purification processes and increasing risks of infectious disease and of exposure to toxic chemicals.

Sea-level rise puts water supplies at risk:

- Coastal areas experiencing sea level rise may become uninhabitable, forcing currently secure water sources out of use because of saline intrusion.
- Salt water intrusion may also corrode materials used in water distribution.

Changes in frequency, duration and distribution of floods and droughts can affect water supply and sanitation services and infrastructure:

- The sector may see increased disruption in services due to break-down in water distribution pipe-lines from extreme events such as increased flooding and storm surge, unseasonal precipitation patterns and flash floods.
- The structural integrity of basic water infrastructure may deteriorate due to floods, and periods of intense heat and cold temperatures.
- Increases in the intensity of floods may result in the contamination of water sources and may increase the incidence of water borne and water related diseases.
- Increases in the frequency and intensity of droughts will cause reduced surface water flows and falling groundwater tables which can lead to increasing water source pollution and wells drying up, extending distances that must be traveled to collect water.

Changes in temperature and precipitation can also increase water demand:

- Higher temperatures may increase agriculture water demand due to a decrease in soil moisture conditions.
- Increases in periods of intense heat may result in higher water demands for domestic and industrial uses.

Expected Climate Change Impacts on Road Infrastructure (Timor-Leste, Vanuatu):

The planned sub-projects in the Road Transport Sector are in Timor-Leste and Vanuatu and are relevant for planning in Tuvalu. The proposed sub-project in Tuvalu also touches on this sector as it is a cross-cutting infrastructure sub-project. While a detailed analysis will be needed to identify specific vulnerabilities in each sub-project area, below is a description of how these sectors have generally been found to be affected by climate change.

Frequency, duration and distribution of current and future extreme events can reduce mobility and damage critical infrastructure:

- Landslides and mud-flows onto roads result in road closures and human and social risks
- Debris flows and rock-falls reduce road safety, damage infrastructure and cover roadways for reduce passage, reducing returns on investments and mobility
- Floods can cause river channels to migrate, particularly in alluvial fans, damaging stream crossings

In coastal areas, storm surges and sea-level rise puts critical road infrastructure at risk:

- Increased salinity increases corrosion of materials which can break-down
- Road is eroded by increased wave action

- Increased flooding from overtopping of sea-water over road or salt-water intrusion in to groundwater
- Storm surges and wave action put coastal ecosystems at risk, removing ecosystem buffers which protect coastal infrastructure
- Increased scouring and collapse of abutments and embankments

Changes to temperature and precipitation patterns can cause:

- Reduced water availability during construction can compromise the ability to compact materials
- Increased moisture content in the subsurface which can result in increased penetration of water into the fill, which may collapse
- Permanent submerging of the road from surface and subsurface flooding (rising water tables)
- Reduced effectiveness of drainage which results in a reduction in the bearing capacity of the soils which become saturated
- Gully erosion from increased runoff which damages the road
- Stream crossings and bridges damaged because increased debris flows from dying vegetation in water-basins reduce clearance under stream crossings and rivers
- Increased desertification can cause sand cover on carriageway, reducing road safety and requiring higher maintenance costs
- Road traffic in dry areas, particularly if roads are unpaved, increases respiratory illnesses from dust

Increase in wind strength:

- Vertical signage cannot withstand higher wind velocities
- Fallen trees increase accidents and road closures

Expected Climate Change Impacts on the Urban Development sector (Vanuatu):

The proposed project in Vanuatu is focused on water drainage and water supply and sanitation infrastructure in Urban Centres. An initial assessment has identified the following expected problems for the project site: Accumulation of higher amounts of silt and debris in drains from increase rainfall intensity; Increasing occurrence of tide locking, due in part to sea level rise; and, Overflow of sanitation systems from coastal flooding.

The urban planning sector is multi-sectoral by nature and so the issues raised in each of the other sector descriptions apply here as well. One of the biggest challenges however related to the interlinkages of the services provided by different sectors, for example energy and transport networks and zoning and settlement management. Some particular considerations in the Pacific Island urban areas include:

- Sea-level rise and increased intensity of tropical cyclones puts densely populated, low-lying coastal megacities and coastal populations at risk in Pacific small islands.
- Half of the expected 8.7 to 9.3 billion population in 2030 is expected to live in overcrowded, unserviced slums, often situated on marginal and dangerous land. Climate change-induced extreme weather likely to exacerbate their already poor living conditions.
- The poor in urban and urbanising cities are highly vulnerable to climate change because of limited access to profitable livelihood opportunities, and access to areas that are fit for safe and healthy habitation. Consequently, they are likely exposed to more risks from floods and other climate-related hazards in areas they are forced to stay in.
- Water shortages have been attributed to rapid urbanisation and industrialisation, population growth and inefficient water use, aggravated by changing climate and its adverse impacts on demand, supply and water quality.
- Future temperature rise from global warming and local urban heat-island effects makes cities more vulnerable to higher temperatures.
- The observed urban heat-island phenomenon will lead to further increased temperatures in urban areas, with negative implications for energy and water consumption, human health, and localized ecosystems.

F.2 Sector based adaptation additional activities and benefits

The following Table 6 presents the expected additional adaptation sub-projects which will complement the baseline ADB programming. The section below identifies a set of potential adaptation strategies which can achieve the program objectives to reduce vulnerability of critical infrastructure and hence the populations which depend on them. Critically, the outcomes of each sub-project will be shared regionally through a suite of cross-cutting activities executed through ADB-managed regional projects and through dedicated support valued at \$600,000.

****Further specific details on each sub-project is provided in Annex 1**

Table 6. Expected sub-projects, LDCF and baseline notional financing (see Annex I for sub-project descriptions)

No.	LDCF Project Title	Country	Year Start	LDCF Budget, (million)	Expected Co-financing (million)
1	Protecting coastal urban areas against the impacts of climate change in Vanuatu	Vanuatu	2014	5.75	6.00
2	Securing urban water supplies under climate stress	Timor-Leste	2014	3.04	6.00
3	Up-scaling climate-proofing in the transport sector in Timor-Leste: Sector wide approaches	Timor-Leste	2014	4.56	39.00
4	Infrastructure Prioritization, Planning and Budgeting for Adaptation	Tuvalu	2014	0.55	0.22
	TOTAL			13.9	51.22

Water Supply and Sanitation (WSS) potential adaptation additional activities and benefits

- Water supplies can be protected against increasing seasonal and annual precipitation variability by building additional water storage infrastructure such as reservoirs or storage tanks which provide a buffer for changes in water availability.
- Adjusting infrastructure designs such as increasing storage capacity and allowing for flexibility in the operation of water systems can build climate resilience to changing conditions, such as changes in the seasonality of precipitation, or changes in flood return periods.
- Building and redesigning flood protection infrastructure can help avoid water pollution and other damages arising from increased flooding. In some cases, water storage can also contribute to flood control.
- Increasing the coverage of water supply infrastructure can enable access to stable sources of water under changing water availability conditions and promote good hygiene.
- Increasing the coverage of sanitation infrastructure can decrease the contamination of water due to increases in precipitation and floods.
- Integrated water resources management can help allocate scarce water resources among competing water demands and uses in the context of climate change.
- Promoting an efficient use of water through programs for water conservation and water recycling can help reduce water demand levels in a context of decreasing water availability.
- In coastal areas facing salinity intrusion, water utilities may end up resorting to desalination of water to supplement insufficient freshwater resources. Nevertheless, desalination is an energy intensive process which contributes to increasing greenhouse gas emissions and other environmental impacts.
- Preparing a disaster response strategy can reduce the negative effect of water services disruptions, particularly for critical services such as for domestic use and sanitation services.
- Equip water authorities and stakeholders with sufficient and adequate data, information and skills to respond to climate impacts and disasters.

Assessment and Information Needs for Water Supply and Sanitation Adaptation

- Assess climate change impacts and vulnerability both in biophysical and socio-economic terms to identify hotspots and prioritize adaptation investments.
- Assess and compare the costs, benefits and suitability of various adaptation options.
- Establish monitoring indicators of climate risks, thresholds and acceptable coping ranges at the sector and project level. This can contribute to improved climate risk management and planning.
- Develop tools for rapid assessment of the vulnerability of a water utility to climate change.
- Generate hydrological and hydro-geological information for planning future water supplies under climate change.

Associated WSS Adaptation Benefits: Greater water security is achieved under uncertain current and future water availability and other climate changes. Impacts on health due to water-borne and transmitted diseases are minimized under more extreme climatic conditions.

Urban Development potential adaptation additional activities and benefits

Urban Planning

- Spatial planning and the choice of location should try to maintain or reduce flood and inundation risks; in some cases, planning should limit new development on flood plains and coastal areas.
- The layout and design of urban areas can also reduce flood risks, for example using only floor levels above expected flood water level for accommodation.
- The urban heat-island effect can be alleviated by greening areas, providing shade, and minimizing paved surfaces.
- Planners can establish building codes and standards for infrastructure that take into account changes in climate such as new flood return periods.
- Increasing the coverage of infrastructure services for low income groups can foster their adaptive capacity and prevent more inequitable outcomes induced from changes in climate.
- Prepare disaster response strategies for energy, water and communication service disruptions.

Water Systems in Urban Areas

- Increasing storage capacity can provide water resources in drought periods.
- Promoting the adoption of water conservation techniques and water recycling can improve resilience of the sector to decreased water availability.
- Additional or redesigned urban drainage may be needed to alleviate the effects of increased precipitation.
- Increasing the height and set back of flood defenses and sea-dykes can reduce flood risks.
- Adjustments in water treatment plans may be needed to maintain the quality of water and level of sanitation.

Energy Systems in Urban Areas

- Promoting energy efficiency in buildings such as proper insulation can reduce energy demand.
- Energy supplies can be protected by seeking ways to adjust infrastructure design to withstand changing climate conditions.

Assessment and Information Needs for Urban Planning

- Assess climate change impacts and vulnerability both in biophysical and socio-economic terms to identify hotspots and prioritize adaptation investments.
- Assess and compare the costs, benefits and suitability of various adaptation options.
- Establish monitoring indicators of climate risks, thresholds and acceptable coping ranges at the sector and project level. This can contribute to improved climate risk management and planning.

Associated Urban Adaptation Benefits: Populations are less affected from negative health effects and loss of livelihood and water and sanitation assets, particularly the poor. Businesses may benefit from reduced interruptions to these operations from water shortages.

Road Sector Adaptation potential adaptation additional activities and benefits

- Protecting key facilities against extreme weather events
- Retrofitting structures to ensure appropriate protection, redesign or relocation of road facilities
- Increased attention to temperature variations as a factor in the selection of asphalt cements (and asphalt emulsions for surface-treated roads to maintain pavement integrity)
- Adoption of environmental measures to help conserve fauna and flora, like protecting and enhancing migration corridors to allow species to migrate as climate changes
- Special attention to transport and road infrastructure systems that are inappropriate to the given topography (e.g. subject to damage by landslides, sea-level rise or flooding due to climate change)
- Promoting shore protection techniques that do not destroy surrounding habitat.
- Improving early warning systems and flood hazard mapping for storms and geotechnical risks

Other Adaptation Measures that can protect road assets

Undertake vulnerability and impact assessments as input into master planning for the transport sector to ensure protection of infrastructure, minimize the creation of vulnerability, and ensure mobility goals can be met

Improve integrated spatial planning to ensure that road alignments and adjacent critical ecosystems which serve as buffers against floods, droughts, earthquakes and other extreme events are maintained and protected

In some cases, road corridors can be protected with engineered structures such as sea-walls and levees

Drainage capacities can be increased to accommodate more intense rainfall and erosion events

Ensure road networks that provide access to hospitals and evacuation centres, distribution of medical supplies especially during emergencies

Associated Road Adaptation Benefits: Reduced financial burden to governments for maintaining at risk roads, more secure access to markets and public services, reduced damages to surrounding land and loss of life due to reduced road safety due to floods and reduced visibility and traction.

G. Describe the socioeconomic benefits to be delivered by the Program at the national and local levels, including consideration of gender dimensions, and how these will support the achievement of global environment benefits (GEF Trust Fund) or adaptation benefits (LDCF/SCCF).

As the description of the adaptation benefits above illustrate, the targeted infrastructure provides public social goods such as a safe living environment, access to amenities and mobility, access to clean and safe drinking supplies, and secure energy for the public and private sectors. These are all essential services for achieving social, economic and political growth and stability. As climate change impacts add a new burden to achieving these services, this program will seek to reduce damages that may occur and, overall, improve planning and design of the infrastructures that provide these services by considering how climate changes may disrupt them. As is often the case, the poorest and most marginalized segments of the population are most affected by losses in services. Vulnerability assessments and adaptation design will in particular consider how this population can best benefit from the program.

Women are often amongst the most vulnerable within societies. Women in the Pacific perform multiple roles as household managers, subsistence and cash crop farmers, income earners, and active members of churches and community groups. In all these roles, infrastructure services are important determinants of opportunity. Climate change impacts to these services therefore also affect them the most.

ADB is committed to gender mainstreaming projects to promote women's empowerment, particularly in rural areas. Support for investment projects include sector-specific gender analysis and gender awareness activities, and incorporate gender performance indicators and targets within country and sector results frameworks. Gender action plans will be included in all projects submitted under this program, in line with ADB requirements.

H. Justify the type of financing support provided with the GEF/LDCF/SCCF resources:

As described above, ADB will provide the baseline investments of approximately \$50 million for mainstream development activities. While ADB has been working to undertake risk assessments and include adaptation considerations into its programming, greater levels of dedicated financing are required to reduce the vulnerabilities of Pacific countries. Further, the scale of the needs in the Pacific Islands is beyond what existing national development budgets can justify and absorb. There is also a resource constraint to upscaling and expanding existing project based efforts that this project will seek to catalyze.

A limiting factor in developing and implementing comprehensive adaptation strategies in the infrastructure sectors is that the project partners and expertise are highly specialized, and project teams are focused on interventions in their sectors only. While this is essential to ensuring the safety and integrity of infrastructure, adaptation often requires a broader assessment and solution space. The LDCF resources will be important for bringing in non-traditional perspectives in terms of infrastructure planning, such as coastal zone management experts, risk analysis expertise and green infrastructure innovations.

Further, the LDCF resources will be essential to collecting lessons learned, developing methodologies appropriate to Pacific Islands, and learning across sectors and countries. This will leverage the expertise in individual projects and countries and exchange them in an efficient way. The LDCF will support the countries implement their NAPAs while at the same time benefiting from experiences developing in the region.

The grant resources are relatively small in comparison to the baseline funding, but will allow for enhancing their implementation by thoroughly integrating adaptation concerns. The programmatic approach will ensure greater efficiency, creating the ability to rapidly respond to urgent and immediate needs as identified in each country's NAPA.

I. Indicate risks, including climate change risks that might prevent the program objectives from being achieved, and if possible, propose measures that address these risks to be further developed during the program design:

Common Risks	Risk Level*	Programmatic Mitigation measure
<p>Climate Data Limitations: Due to a lack of consistent climate data in these countries, it is a challenge to examine climate risk with accuracy. Furthermore, this lack of data also means that there is not enough information to develop detailed spatial mapping to allow for adequate planning for risk reduction.</p>	H	<p>The countries will benefit from the time, financial and human resource efficiency of developing common risk management approaches to deal with a common lack of data and data infrastructure. The program will build on existing work that has begun in the region, such as through the GEF financed Pacific Program and other LDCF funded projects. The data and scenario products from the Pacific Climate Change Science Program will be examined to identify its usefulness for this level of field work – they have made substantial strides in helping PICs rescue and analyze historical climate data, as well as developing consistent climate scenarios for each of the PICs, and a considerable amount of data are now made available online.</p>
<p>Human and Financial Capacity Limitations: All of these countries are restrained by human and financial capacity; hence its ability to respond and cope with natural disasters and long-term environmental change is very limited. Technical capacity constraints and the fragmentation of responsibilities for infrastructure, climate change, natural resources and disaster risk reduction pose challenges for the effective implementation of the NAPA.</p>	M	<p>The benefit of using a programmatic approach is the pooling and exchange of human resources. South-south collaboration will be promoted through the project as well as technology transfer across the region.</p>
<p>Institutional Limitations: There are limited frameworks or regulations in place to support climate change adaptation in these countries. Further, climate change is perceived by many as something unknown that will happen in the future, and therefore difficult to plan for. There is a lack of capacity within related institutions to formulate climate change related laws and regulations, policies and programs and project implementation. Further, building climate resilience requires coordination among relevant institutions which remains a challenge.</p>	M	<p>The programme will address current urgent and immediate risks related to climate variability, and this will be complimented by forward thinking. The LDCF financing will be used to finance small scale infrastructure upgrades which the country would not have been able to do otherwise. As financing is limited and needs are great, a piloting and learning approach will be taken to test and learn which technologies are most effective in avoiding losses of life and livelihoods. Further, the program will improve capacities for better planning and demonstration pilots. Careful attention will also be given to coordination with other programs and projects and the timing of interventions to avoid over stretching limited human resource capacities.</p>
<p>Political commitment: While Pacific Island nations recognize the importance of climate change adaptation, limited capacity and competing development priorities may affect political will to</p>	M	<p>An assessment of political economy factors that could influence the government's ability to implement and proposed adaptation reforms will provide a basis for monitoring risks. Risks related</p>

participate in the program. Further, the sustainability of political commitment to reforms, including strengthened budget management, state-owned enterprise reform, and asset management is a constant challenge.		to limited absorptive capacity are being addressed through longer- term and phased technical assistance by ADB, as well as continual consideration of the nature of ADB in-country presence.
Geographic Diversity: There is enormous geographical diversity within these countries, both geographic (i.e. mountainous interiors and low lying coasts) and cultural.	L	A set of priorities will be confirmed across the four countries which have some common properties, such as urban or coastal challenges. These will help to address common challenges across the four countries to achieve greater economies of scale.

* L= Low, M=Medium, H=High

J. Outline the institutional structure of the program including coordination and monitoring & evaluation:

Coordination, monitoring and evaluation will take place at the program and project levels. At the program level, ADB will set up an internal program support unit (PSU) which will: provide oversight to the implementation of the individual sub-projects, coordinate regional activities, organize program steering committee meetings, track lessons learned, manage the mid-term and final evaluation processes, coordinate with country OFPs and project executing agencies, identify capacity constraints and develop targeted capacity support including regional training for country project leaders.

The Unit will be responsible for integrating the Monitoring and Evaluation (M&E) criteria into the baseline project's Design and Monitoring Framework (DMF), or, as needed, developed separate monitoring and evaluation requirements for the LDCF resources and objectives. The Unit will track program indicators and prepare progress reports to the GEF. A separate mid-term and final evaluation will be undertaken for this program, given its priority and learning opportunities which can be further analyzed through M&E. The mid-term evaluation will take place during the first two years and will be designed to identify gaps and constraints which can be addressed during the remainder of the program time-frame.

At a country level, the executing agencies will be those who are responsible for the baseline project, often Ministries of Infrastructure or other line Ministries. As these are sector specialists, broader level input will be needed. Country level Steering Committees will be formulated, building on existing structures and donor coordination mechanisms as much as possible, to provide advice to the executing agencies. The project preparation and design phase will identify appropriate stakeholders in more detail for each sub-project and the nature of their involvement will be agreed. The regional activities under this program will include specialists who will provide dedicated support to the executing agencies. The establishment of a program level Steering Committee will also be considered and might include of the chairs of each country steering committee.

ADB project officers will provide direct oversight to the implementation to each baseline project as well as to the LDCF components of the projects, with technical support from the PSU and with support from the ADB-GEF Focal Point in ADB's Environment and Safeguards Division. ADB maintains a network of country and Pacific Regional Offices, as well as country and sector specialists. The detailed project management, oversight, monitoring and coordination arrangements will be fully developed at the CEO endorsement stage.

As a number of programs are ongoing in the Region, further coordination and consultations with the following programs and institutions will be undertaken during project preparation, amongst others:

a) The Pilot Program for Climate Resilience (PPCR) is a global and multi-donor initiative (9 country and 2 regional pilots), funded by the MDBs' Climate Investment Fund, which aims to achieve transformational impacts in climate adaptation on the ground. The Pacific Island countries selected for partnerships are Papua New Guinea, Samoa and Tonga. None of the countries included in this proposed LDCF program are receiving individual PPCR resources.

All 14 countries in the Pacific are however, part of the regional track under the PPCR. A technical assistance (TA) program is underway under this track. The TA components are: 1. Support and improve climate change adaptation mainstreaming and disaster risk management in national development policies and plans; 2. Identify and implement practical climate change adaptation knowledge and experience; and 3. Enhance capacity of PICs to access and manage climate change resources. This TA is being implemented jointly by the ADB and the World Bank and consultation with this program will take place to ensure complementarity.

b) The Pacific Region Infrastructure Facility (PRIF) is a multi-partner infrastructure coordination and financing mechanism. It was initiated in 2008 by the Asian Development Bank (ADB), the Australian Aid Program (AAP), the New Zealand Government via the New Zealand Aid Programme (NZMFAT), and the World Bank Group (WBG). The European Commission (EC) and the European Investment Bank (EIB) became members of the joint initiative in 2010. The PRIF builds on successful activities in the Pacific, helps address gaps in existing infrastructure, and is developing innovative approaches to the problems of delivering infrastructure services in the Pacific. The PRIF also aims to support infrastructure planning, development and management in Pacific island countries in the following economic infrastructure sectors. Given the focus of this program to support adaptation in the planning and development of infrastructure, it will be essential to involve this institute in designing appropriate knowledge, planning and communication channels.

c) The Strengthening Disaster and Climate Risk Resilience in Urban Development in the Pacific (Financed by the Japan Fund for Poverty Reduction) project will ensure that climate and disaster risk information is integrated into urban development and infrastructure planning in Pacific DMCs.. The project is being coordinated through through the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI), and initiative jointly launched in 2007 by the ADB, the Secretariat of the Pacific Community (SPC), and the World Bank to increase the financial resilience of Pacific DMCs to natural disasters and to enable them to better cope with the aftermath of such events. The PCRAFI aims to (i) develop a regional catastrophe risk insurance pool to enhance the capacity of Pacific DMCs to manage natural disasters, (ii) provide immediate liquidity resources to restore essential services to countries affected by natural disasters, and (iii) assist with recovery and reconstruction activities. The outputs of the project will support PCRAFI through: operationalizing integrated climate and disaster risk assessment tools for planning; sharing integrated tools for mainstreaming disaster and climate risks into urban and sector planning; and ensuring that Pacific DMC planners apply newly acquired climate and disaster risk mainstreaming skills.

d) The EU/GTZ funded Global Climate Change Alliance is supporting Vanuatu (Disaster Risk Reduction in water and agriculture) and Solomon Islands (Disaster Risk Reduction) as well as a regional Pacific initiative with the ACP (African, Caribbean, and Pacific Group of States) Secretariat. The regional initiative aims to build government capacity and to raise public awareness in the water and agriculture sectors. Further consultation is needed to identify ongoing and planned activities.

e) The Secretariat of the Pacific Regional Environment Program (SPREP) is a focal point for a number of climate change vulnerability, impact and adaptation activities in the region from research and capacity building to financing and implementation support. Discussion will ensure proper engagement and information exchange.

f) The GEF funded Pacific Adaptation to Climate Change Program is implemented by UNDP in partnership with SPREP. The regional program covers Tuvalu, Vanuatu and Solomon Islands. The only country on common with this proposal is Vanuatu where the UNDP project is “Demonstrating the integration of climate change risk reduction in road design in Epi, Shefa Province”. There is no apparent overlap with the proposed program as the sectors and locations are different. However, discussions with UNDP and SPREP at the beginning of project preparation will seek out coordination opportunities, in particular for capacity building and regional coordination activities.

g) The Australian and New Zealand governments are both highly active in the region and will be consulted at the onset of project design. The Australian government’s Pacific climate change science program (PCCSP) including “Climate Futures”, for example, is aiming to help fill the information gap in the region by examining past climate trends and variability and providing regional and national climate projections. The PCCSP works closely with another key program, the Pacific Adaptation Strategy Assistance Program, which aims to enhance country capacity to assess their vulnerability to climate change and develop evidence-based adaptation strategies. The PCCSP aims to

strengthen the capacity of 15 countries in the region to participate in and undertake climate change science research. Discussion with these partners will include, in particular, identification of how these above noted programs might provide data and information to the proposed LDCF program.

h) ADB also supports the “Asia and the Pacific Adaptation Network”, and will seek out opportunities for sharing information and experiences through this Network.

K. Identify key stakeholders involved in the program including the private sector, civil society organizations, local and indigenous communities, and their respective roles, as applicable:

The program has the following key stakeholders:

i) *Local vulnerable populations:* The most important stakeholders are those who are most vulnerable to the impacts of climate change. Within the country populations are often sub-groups who are most impacted, such as the poorest segments of society, women, farmers and marginalized populations. Particular attention will be given to consulting these groups during project design to identify their concerns and needs and to ensure they are addressed as best as possible within the context of the program.

ii) *Executing agencies and interdepartmental project partners:* The key executing agencies in this program will be line Ministries who do not necessarily have the expertise in adaptation to climate change that is needed. There will be a need to coordinate between departments and with regional centres of excellence and expertise. Targeted regional activities will also be organized through the regional sub-project to build capacity and exchange expertise between countries and sectors.

iii) *Regional Institutions and Committees:* The program supports the achievement of regional agreements such as the Pacific Plan for Strengthening Regional Coordination and Integration and the Pacific Islands Framework for Action on Climate Change 2006–2015. Results will be reported to these bodies to facilitate coordination. Also, institutions such as SPREP, the Pacific Islands Forum Secretariat (PIFS) and the Secretariat of the Pacific Community’s (SPC) Applied Geoscience and Technology Division (SOPAC) play an important role in developing regional expertise, skills and capacities. Coordination with these bodies during the project preparation phase will determine appropriate involvement.

iv) *Civil Society organizations and academia:* At the individual country and project level, these institutions will be invited to input in project design and implementation. Adaptation can often broach sensitive issues such as indigenous rights and land-tenure and rights. Adaptation solutions must be respectful of these issues and consultations and involvements by key stakeholders will help avoid conflict and improve design and implementation. Further, academia in the region and internationally may be drawn on to provide expert advice.

v) *The Private Sector:* The types of investments that are needed for Pacific Adaptation and significant and opportunities for drawing in the private sector will be sought, such as, for example, addressing water supply utilities in Timor-Leste and Vanuatu. These opportunities will be scoped further during program and project implementation.

vi) *Bilateral and multilateral development organizations:* As described in the section above, coordination with these groups will take place during project preparation.

vii) *The international community:* The global community is learning how to adapt together, lessons drawn from this program will be communicated through, for example, the Asia Pacific Adaptation Network (APAN). Also, technologies and know-how from different regions may serve as valuable input in determining the best adaptation strategies in the Pacific. The Caribbean and Indian Ocean regions, for instance, face some similar challenges as in the Pacific and there is much opportunity for south-south learning.

L. Indicate the co-financing amount the GEF agency is bringing to the project:

The co-financing is expected to be approximately \$ 51.22 million.

M. How does the program fit into the GEF Agency's program (reflected in documents such as UNDAF, CAS, etc.) and the Agency staff capacity in the country to follow up program implementation:

Pacific region

ADB's Regional Operations Business Plan: Pacific (2013-2015) aims to help the region realize its full economic and social development potential, and to facilitate Pacific's participation in wider Asian integration guided by the Pacific region's own Pacific Plan. In accordance with Pacific leaders' vision and other decisions relating to its implementation, the Pacific Plan has the goal of enhancing and stimulating economic growth, sustainable development, good governance, and security for the Pacific countries through regionalism. To meet this goal, the strategic objectives of the Pacific Plan are (i) economic growth, (ii) sustainable development, (iii) good governance, and (iv) improved political and social conditions for stability and safety. The "Pacific Approach" will be achieved through an agenda aimed at fostering connectivity, consensus, and a greater sense of Pacific community through (i) inclusive and environmentally sustainable growth, (ii) good governance, and (iii) regional cooperation and integration. The operational priorities of ADB for 2013–2015 are (i) transport and information and communication technology (ICT); (ii) public sector management; (iii) gender equity; (iv) energy; (v) environmental sustainability; (vi) private sector development; (vii) education. Importantly, the regional objective under the environmental sustainability theme is reduced vulnerability of Pacific countries to risks and impact of global climate change.

Supporting ADB's program in the Pacific is ADB's Pacific Regional Department in Manila, Philippines. In addition, ADB has established a Pacific Liaison and Coordination Office in Sydney, Australia, as well as a resident Mission in Papua New Guinea, a Special Office in Timor-Leste and a Pacific Subregional Office in Suva, Fiji.

Country programs

At the national level, ADB develops its priorities for assistance in cooperation with governments through Country Programming Strategies (CPSs) and Country Operations Business Plans (COBPs):

Timor-Leste Country Programming Strategy

ADB's country partnership strategy, 2011–2015, continues ADB's strategic directions in Timor-Leste by concentrating on infrastructure development and management. ADB plans to provide complementary assistance in the core specializations of finance, regional cooperation and integration, and education, and will support the private sector as a key driver of change to help Timor-Leste make the transition from a public-sector-led economy. To help drive change, the strategy will selectively support the drivers of change of good governance and capacity development, gender equity, knowledge solutions, and partnerships.

ADB support will remain focused on improving the delivery of water supply and sanitation services to urban centers such as Dili, Manatuto and Pante Makassar. This will extend to facilitating the engagement of the private sector in water supply and sanitation via public–private partnerships. ADB will help address high-priority water supply issues in rural areas when resources are not available from other development partners. The creation of technically, financially, and environmentally sustainable services will be central to ADB assistance to water supply and sanitation. ADB assistance will emphasize women's involvement to address gender issues in project design and community-level maintenance for the sustainability of water supply and sanitation systems. An adaptation project in the road sector was initiated by ADB in 2009 and this will be expanded through this program. Lessons learned from previous projects here will improve on approaches initiated through this program.

Vanuatu Country Programming Strategy

ADB's proposed strategic support for Vanuatu can be divided into three core sectors and one core theme. The core sectors are: (i) transport to improve connectivity to markets and social services; (ii) urban development to improve access to sanitation, drainage, and other urban infrastructure, particularly in Port Vila; and (iii) energy to increase

energy efficiency and the development of renewable energy sources. To help reduce poverty and address the high levels of inequality, the proposed strategic interventions will have a particular focus on disadvantaged areas and groups by combating rural isolation, upgrading urban slums, broadening access to affordable power in the countryside, and widening opportunities for rural enterprise development.

Natural resource management considerations will be incorporated in all ADB operations because of the fragility of the natural resource base, the threat posed to the natural eco-system by rapid population growth, unplanned urbanization, climate change and Vanuatu's exposure to natural disasters, and because of the strong link between poverty and resource degradation. ADB will focus on: (i) building Government capacity to incorporate environmental considerations into planning and regulatory enforcement, particularly in inter-island shipping and urban development; (ii) fostering the use of sustainable energy sources; and (iii) climate-proofing infrastructure interventions to ensure that Vanuatu is prepared to meet the challenges arising from climate change. ADB will incorporate sound environmental management and climate change concerns in its operations through application of its environmental and social safeguard policies and, through policy dialogue, will encourage the Government to adopt similar standards for its larger natural-resource intensive projects.

Tuvalu Country Programming Strategy

The ADB Pacific Approach recognizes that in a micro-economy such as Tuvalu, poor expenditure allocation decisions have significant opportunity costs that impede development and growth. For this reason, the focus of support to Tuvalu is on improving public sector management and the environment for private sector development. Support will be provided for strengthening budget management and implementing public enterprise reforms. Strengthening of public sector management will also provide fiscal space to enable policy makers respond to future exogenous shocks when these occur. Tuvalu's Country Operations Business Plan (COBP) 2014-2016 is consistent with the Pacific Approach and its drivers of change.

While adaptation to climate change remains a key national priority, the area is comprehensively supported by other donors and is therefore not a high priority for ADB. ADB will, therefore, provide assistance for climate change activities only on a highly selective and opportunistic basis, funded under regional technical assistance programs, and in line with ADB's climate change implementation plan for Pacific developing member countries.

ADB's Climate Change Program

ADB's Long-Term Strategic Framework (Strategy 2020), includes environmentally sustainable growth as one of its 3 strategic agendas along with inclusive growth and regional integration. With respect to climate change ADB has adopted an integrated approach—addressing climate change mitigation and adaptation, facilitated by financing, knowledge generation, and partnerships. This focuses on 5 priorities clean energy, encouraging sustainable transport and urban development, managing land use and forests for carbon sequestration, promoting climate-resilient development, and strengthening related policies and institutions.

In promoting climate-resilient development, ADB seeks to ensure that its development objectives can be achieved over a wide range of potential climatic conditions. It promotes adaptation activities that work to eliminate poverty and build a climate-resilient Asia-Pacific. Solutions include investing in water supply, sanitation, irrigation, flood control, transport and energy infrastructure that build resilience to current and future climate variability. Investment in sectors such as health and education will also improve countries' capacity to adapt. By assisting vulnerable communities and economic sectors in coping with climate variability and extremes, ADB is strengthening their resilience to the long-term and uncertain impacts of climate change. Examples of ADB projects in this area can be found at: <http://www.adb.org/themes/climate-change/climate-resilience>

In relation to the proposed LDCF program in the Pacific, 3 areas of ADB's current knowledge development work for climate change adaptation is also highly relevant:

AWARE Tool: Aware for Projects is a web-based, rapid climate risk screening tool, developed by Acclimatise (A UK-based company specializing in climate risk management) in close collaboration and consultation with ADB.

Working with in-built datasets (of a 50km by 50km resolution) on observed and model projected climate data and natural hazards (e.g. landslides) and sensitivity of key project components to climate variables provided by users, the Tool produces a climate risk assessment report. The report provides a summary of key risk areas (with a ranking of low, medium or high), as well as narratives on potential impacts and adaptive measures for further consideration. As part of the program the tool will be applied in undertaking rapid initial risk screening of the projects as a basis for further climate change vulnerability assessments.

Regional Climate Projections Consortium and Data Facility: ADB is facilitating the development of a regional climate projections consortium and data facility. The Facility aims to provide improved access to scientifically robust and well documented climate data and scenarios, accompanied with capacity building and user services. The design of the Facility is based on user needs identified through consultations and other relevant analyses. Reflecting the diverse range of adaptation decision contexts, the Facility will provide a hierarchy of data and scenario products, ranging from more aggregated national level summary information to facilitate awareness raising and policy dialogue, to detailed, high resolution scenarios to inform the engineering design of critical infrastructure. It is expected that the facility will be established and can support assessment work to be conducted as part of the proposed LDCF Program.

Technical Resources on Adaptation: ADB is developing technical resources to assist both its operational staff and its developing member countries partners in managing climate risks confronting their investment projects. These resources encompass guidance materials, technical notes, and case studies on integrating climate change adaptation actions and climate proofing vulnerable investments in critical development sectors. These includes technical notes, that present a step-by-step methodological approach to assist project teams in preparing climate proofing of projects by incorporating adaptation to climate change into respective sector investment projects. These technical notes will be applied and tested through the program, with a view to developing further guidance for climate resilient development for infrastructure sectors in the Pacific.

ADB's Pacific Climate Change Program (PCCP)

ADB's PCCP supports a three-pronged strategy:

- (i) Immediate attention to fast-tracking and scaling up climate change adaptation and mitigation investment, involving: climate proofing of ongoing and planned infrastructure projects of ADB and contributing development partners, promotion of renewable energy through new technology and research and development, and working with partners to manage land, water, forests and coastal and marine resources, including REDDplus (Reduced Emissions from Deforestation and Forest Degradation);
- (ii) Building capacity to strengthen the knowledge, skills, and practices of sectoral agencies and communities in various climate change-related fields to enable integration of climate change into PDMC development plans and programs; and
- (iii) Promoting more effective development partner responses by coordinating and harmonizing their responses, sharing best practices, and helping PDMCs access funding from other global financing facilities.

The PCCP provides the platform for a multi-donor technical and financial assistance facility to support PDMCs in project development and implementation, as well as extend start-up and catalytic financing through deploying staff and engaging long-term consultants to work with PDMCs to improve their access to global climate change funds.

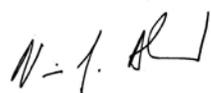
PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)

- A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S):**
 (Please attach the [Operational Focal Point endorsement letter \(for Qualifying GEF Agency\)](#) and [Operational Focal Point Endorsement letter \(for Program Coordination Agency\)](#) with this template.

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
Mr. Albert Abel WILLIAMS	Vanuatu Operational Focal Point, Director	DEPARTMENT OF ENVIRONMENTAL PROTECTION AND CONSERVATION	03/01/2012
Mr. Mario XIMENES	Timor Leste Operational Focal Point, Director	NATIONAL DIRECTORATE FOR INTERNATIONAL ENVIRONMENTAL AFFAIRS EDIFICIO DO FOMENTO, BEBORA, MANDARIM	02/08/2012
Mr. Mataio TEKINENE	Tuvalu Operational Focal Point, Director	MINISTRY NATURAL RESOURCES AND ENVIRONMENT	04/12/2012

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF/LDCF/SCCF policies and procedures and meets the GEF/LDCF/SCCF criteria for project identification and preparation. Following the new project cycle, [Enter Agency(ies) name] will submit all PIFs under the program within 6 months after Council approval of the PFD.

Agency Coordinator, Agency name	Signature	DATE (MM/dd/yyyy)	Project Contact Person	Telephone	Email Address
Nessim Ahmad Director, Environment and Safeguards Division concurrently Practice Leader (Environment) Asian Development Bank		12/17/2013	Bruce Dunn Environment Specialist	+632 683 1922 / +632 683 1983	bdunn@adb.org

ANNEX I. Provisional Country Sub-Projects

Expected sub-projects under the program

1. Protecting coastal urban areas against the impacts of climate change in Vanuatu
2. Securing urban water supplies under climate stress Timor-Leste
3. Up-scaling climate-proofing in the transport sector in Timor-Leste: Sector wide approaches
4. Infrastructure Prioritization, Planning and Budgeting for Adaptation in Tuvalu

Sub-Project 1. Protecting coastal urban areas against the impacts of climate change in VANUATU

Current Situation and Baseline Project

Observational records for Vanuatu's two main urban centres began in 1949 for Port Vila and 1973 for Luganville. The trends suggest a gradual increase in temperature which becomes more marked in the south. Records from both centres suggest a gradual decline in rainfall. There has been a significant increase in the frequency of tropical cyclones in the country as a whole over the record period. A total of 124 tropical cyclones had affected Vanuatu since 1939. Forty-five (36%) of these were categorized as having hurricane force winds (>64 knots), twenty-six (21%) were of storm force winds (48 - 63 Knots) and twenty-five (20%) were of gale force winds (34 - 47 knots). An additional 28 tropical cyclones were not categorized.

Much of the infrastructure, including the main commercial centres of Port Vila and Luganville, is located on the perimeter of the major islands. These centres are only a few metres above sea level. Moreover, much of the road network is also situated on the perimeter of the islands. The infrastructure and other fixed assets are extremely vulnerable to cyclone and storm surges. These areas will be affected by even small increases in sea levels due to the larger surges associated with increased frequency and intensity of tropical cyclones. Enhanced human activities in the coastal areas, including sand extraction and mangrove and other coastal vegetation removal has increased the sensitivity of these important coastal buffers to climate and sea level variations. This is due to either a lack of enforcement of existing legislations or because of ignorance and the lack of proper management systems.

Baseline Project

Port Vila (population approximately 42,000) and Luganville (population approximately 15,000) are the two main urban centers. They are the main centers of economic growth and development in Vanuatu. Squatter and informal settlements started to develop in and around Port Vila in the early 1960s, and some 30%–40% of the urban population now lives in these areas. Based on current demographic trends, the population of informal settlements in the peri-urban areas around Port Vila and Luganville could reach 19,000 by 2025. Legislative and regulatory structures for planning and development in Port Vila involve a number of ministries and local government agencies and overlapping responsibilities, capacity gaps, and fiscal authority need to be addressed.

The first phase of Port Vila Urban Development Project (PVUDP) for total US\$39.1 million (US\$5 million ADF loan, US\$31 million grant financing from Australian Aid Program, and US\$3.1 million Government's financing) was approved in December 2011. PVUDP will contribute to economic growth by improving drainage, roads and sanitation systems in greater Port Vila (municipality and adjacent urban and peri-urban areas in the Shefa province). The Project will implement the recommendations of the drainage and sanitation master plan prepared through a project preparatory technical assistance (PPTA) which identified priority interventions for improved access to, and delivery of drainage and sanitation services to the residents of Port Vila. There are also plans to design a phase II project to develop urban

infrastructure in the remaining areas of Port Vila and extend the coverage to Luganville. The specific outcomes and outputs for the second phase of the project has not yet been developed.

Table I:1. Vanuatu Baseline Projects and NAPA priorities

Name of ADB Project*	Year	Sector	EA	Total expected baseline financing	Related NAPA Priority
Urban Development Project, Phase II Greater Port Vila and Luganville	2013	Urban Development	Department of Public Works	6.00 million implementation	NAPA Priority #2. Water management policies/programmes (including rainwater harvesting) <i>NAPA Priority #5. Mainstream climate change considerations into infrastructure design and planning (modern & traditional, EIA)</i>

Proposed GEF-funded Project

The proposed project is focused on water drainage and water supply and sanitation infrastructure in Urban Centres. The barriers which this program will likely seek to address include physical obstacles, such as adjusting drainage and sanitation infrastructure so that it can operate effectively under the impacts of climate change which are likely to include increased siltation into the systems, tide locking, due in part to sea level rise, and erosion and damage due to increased rainfall intensity.

Flooding in Port Vila occurs naturally but is highly exacerbated by man-made factors. In addition however, increasing frequency of larger storms is likely making the situation worse. In a recent study completed by ADB, 8 water catchment areas have been identified as being highly affected by climate change. The increase in floods and sea-level rise is compounded by an increase in droughts, as rainfall also decreases during the dry season. These additional stressors on urban livelihoods will be addressed through this program. An initial assessment has identified the following expected problems for the project site: Accumulation of higher amounts of silt and debris in drains from increase rainfall intensity; Increasing occurrence of tide locking, due in part to sea level rise; and overflow of sanitation from flooding.

While the detailed adaptation activities will be developed during the project design, some potential adaptation activities and benefits include:

Urban Planning

- Spatial planning and the choice of location should try to maintain or reduce flood and inundation risks; in some cases, planning should limit new development on flood plains and coastal areas.
- The layout and design of urban areas can also reduce flood risks, for example using only floor levels above expected flood water level for accommodation.
- The urban heat-island effect can be alleviated by greening areas, providing shade, and minimizing paved surfaces.
- Planners can establish building codes and standards for infrastructure that take into account changes in climate such as new flood return periods.
- Increasing the coverage of infrastructure services for low income groups can foster their adaptive capacity and prevent more inequitable outcomes induced from changes in climate.
- Prepare disaster response strategies for energy, water and communication service disruptions.

Water Systems in Urban Areas

- Increasing storage capacity can provide water resources in drought periods.
- Promoting the adoption of water conservation techniques and water recycling can improve resilience of the sector to decreased water availability.
- Additional or redesigned urban drainage may be needed to alleviate the effects of increased precipitation.
- Increasing the height and set back of flood defences and sea-dykes can reduce flood risks.
- Adjustments in water treatment plans may be needed to maintain the quality of water and level of sanitation.

Energy Systems in Urban Areas

- Energy supplies can be protected by seeking ways to adjust infrastructure design to withstand changing climate conditions.

Assessment and Information Needs for Urban Planning

- Assess climate change impacts and vulnerability both in biophysical and socio-economic terms to identify hotspots and prioritize adaptation investments.
- Assess and compare the costs, benefits and suitability of various adaptation options.
- Establish monitoring indicators of climate risks, thresholds and acceptable coping ranges at the sector and project level. This can contribute to improved climate risk management and planning.

Associated Urban Adaptation Benefits: Populations are less affected from negative health effects and loss of livelihood and water and sanitation assets, particularly the poor. Businesses may benefit from reduced interruptions to this operation from water shortages.

Alignment with GEF and National Objectives

The proposed program will support the NAPA priorities numbers 2 and 5 through the Port Vila and Luganville Urban Development project (PU DP), particularly focused on urban drainage and sanitation services.

Priority #2. Water management policies/programmes (including rainwater harvesting)

Priority #5. Mainstream climate change considerations into infrastructure design and planning (modern & traditional, EIA)

Project Component	Expected Outcomes	Expected Outputs	Indicative Financing (\$)	Indicative CoFinancing (\$)
Component 1. Enabling Adaptation through improved decision-making and knowledge development	1.1 Investment frameworks and decision making methodologies support climate change adaptation	1.1.1 Improved decision making processes critical for budgetary allocations for adaptation in urban planning 1.1.2 Detailed impact and vulnerability information specific to infrastructure	60,000	250,000

		needs for urban planning 1.1.3 Revised policies and investment plans to include climate change adaptation in Port Vila and Luganville (CCA-1, CCA-2)		
Component 2. Strengthening the climate resilience of infrastructure	2.1 Strengthened adaptive capacity to reduce losses due to climate change impacts	2.1.2 Vanuatu Port Vila urban drainage and transport plan include climate change adaptation and disaster risk management	4,800,000	5,500,000
Component 3. Reducing vulnerability through green infrastructure	3.1 Increased deployment of no-regrets risk reduction activities to reduce the vulnerability of infrastructure investments to climate impacts	3.1.1 Green-infrastructure integrated into urban planning and piloted to reduce urban vulnerability. (CCA-1, CCA-2)	690,000	250,000
SUB-TOTAL			5,550,000	6,000,000
Project Management Cost			100,000	
Total Project Costs			5,650,000	6,000,000
Project Preparatory Grant (PPG)			100,000	-
Grand Total			5,750,000	6,000,000

Sub-Project 2. Securing urban water supplies under climate change stress in TIMOR-LESTE

Current Situation and Baseline Project

Water supply, and in particular lack of water in the dry season, is the most important environmental constraint on agricultural production. Farmers identify rainfall and water availability as the two principal environmental constraints on production. Communities face dwindling access to water during the dry season when the largely natural springs that they rely on may reduce considerably in flow or cease altogether. Groundwater resources, which exist in abundance in some areas, remain largely unexploited. Climate change could result in an increased amount of rain received throughout the year. However, the wet season may be slightly drier and the dry season may be slightly wetter. Rainfall may come in the form of fewer but more intense events. El Nino events which result in delayed rain and less rain may become more severe.

The expected barriers to reducing vulnerability in the expected project area include, for one, lack of data required by most engineering methods. Some climate change downscaling has been conducted but with the high variability in the Timorese mountainous landscape, the level of accuracy needed is difficult to come by. This project may seek to strengthen available data but will also examine and agree to a set of agreed assumptions to guide decision-making. For instance, it can be assumed that coastal areas below 2 metres above sea level will be increasingly vulnerable to sea-level rise and a safety factor will be applied to planned works in those areas or, maintenance budgets can be increased in anticipation in more frequent damage. Realignment is often an option but in Timor-Leste it is difficult because of the rise of the mountains soon after the coastline.

In the case of the water sector, lack of information is one of the most evident challenges – not only about climate change but also even of existing resources, such as groundwater. Water extraction projects are proceeding without adequate knowledge of the water yield, including on how that will change in the dry and wet seasons. Water distribution between the dry and wet seasons is another barrier, with either extended drought periods or flood periods. The program will seek adaptation solutions to improve the distribution and efficiency of the water management approaches.

Baseline Project

The government's priority actions in infrastructure include (i) the rehabilitation or upgrade of all national and district roads by 2020, and rehabilitation of all rural roads by 2015; (ii) the provision of access to clean water and improved sanitation for all by 2030; (iii) the establishment of new port facilities in Dili and on the south coast by 2020; (iv) the upgrade of the national airport and rehabilitation of district airports by 2015; (v) the provision of electricity to all by 2015; and (vi) a competitive telecommunications market and comprehensive mobile phone and internet coverage by 2015. The proposed LDCF program will be in support of the government's top two priorities for infrastructure.

In terms of Water supply and sanitation, support will remain focused on improving water supply and sanitation services in urban centers. Investment projects will provide for the rehabilitation and warranted upgrade of systems, and support to ensure the sustainable management of these systems. Support will extend, where feasible, to facilitating the entry of private sector operators through Public Private Partnerships. ADB will help address priority needs in rural areas when resources are not available from other development partners. The creation of technically, financially, and environmentally sustainable services will be central to ADB's assistance to the water supply and sanitation sector.

ADB support will remain focused on improving the delivery of water supply and sanitation services to urban centers such as Dili, Manatuto and Pante Makassar. This will extend to facilitating the engagement of the private sector in water supply and sanitation via public-private partnerships. ADB will help address high-priority water supply issues in rural areas when resources are not available from other development

partners. The creation of technically, financially, and environmentally sustainable services will be central to ADB assistance to water supply and sanitation. ADB assistance will emphasize women’s involvement to address gender issues in project design and community-level maintenance for the sustainability of water supply and sanitation systems.

The planned project *outcome* is for the Nationale Directorate for Water Supply and Sanitation (NDWSS) to provide safe and reliable water supply to district capitals Manatuto and Pante Macasar. The planned *outputs* include: (i) NDWSS rehabilitates and expands Manatuto and Pante Macasar water supply systems; (ii) Households in Manatuto and Pante Macasar have increased knowledge of efficient use of water resources and safe hygiene practices; (iii) Sustainable Operations and Maintenance of water systems practiced by District Directorates (DDWSS) in district capitals; (iv) Sustainably secured water resources in Lake Lehumo; and (v) the Ministry of Infrastructure, District and National Directorates (DNWSS), and DNRBFC provide efficient project management and monitoring services.

Table II:1. Timor-Leste Baseline Project and NAPA priority

Name of ADB Project*	Year	Sector	EA	Total expected baseline financing	Related NAPA Priority
1. District Capital Water Supply Project (Subject to additional Financing)	2012	Water Supply and Sanitation	Ministry of Infrastructure	6.00 million, subject to financing	<i>NAPA Priority #2. Water Resources: Promotion of Integrated Water Resource Management (IWRM)</i> <i>NAPA Priority #7: Physical Infrastructure: Improved Regulations and Standards for Climate-resilient Infrastructure</i>

Proposed GEF-funded Project

While the exact adaptation needs will need to be confirmed during the project design, potential adaptation additional activities and benefits include:

- Water supplies can be protected against increasing seasonal and annual precipitation variability by building additional water storage infrastructure such as reservoirs or storage tanks which provide a buffer for changes in water availability.
- Adjusting infrastructure designs such as increasing storage capacity and allowing for flexibility in the operation of water systems can build climate resilience to changing conditions, such as changes in the seasonality of precipitation, or changes in flood return periods.
- Building and redesigning flood protection infrastructure can help avoid water pollution and other damages arising from increased flooding. In some cases, water storage can also contribute to flood control.
- Increasing the coverage of water supply infrastructure can enable access to stable sources of water under changing water availability conditions and promote good hygiene.
- Increasing the coverage of sanitation infrastructure can decrease the contamination of water due to increases in precipitation and floods.
- Integrated water resources management can help allocate scarce water resources among competing water demands and uses in the context of climate change.

- Promoting an efficient use of water through programs for water conservation and water recycling can help reduce water demand levels in a context of decreasing water availability.
- In coastal areas facing salinity intrusion, water utilities may end up resorting to desalination of water to supplement insufficient freshwater resources. Nevertheless, desalination is an energy intensive process which contributes to increasing greenhouse gas emissions and other environmental impacts.
- Preparing a disaster response strategy can reduce the negative effect of water services disruptions, particularly for critical services such as for domestic use and sanitation services.
- Equip water authorities and stakeholders with sufficient and adequate data, information and skills to respond to climate impacts and disasters.

Assessment and Information Needs for Water Supply and Sanitation Adaptation

- Assess climate change impacts and vulnerability both in biophysical and socio-economic terms to identify hotspots and prioritize adaptation investments.
- Assess and compare the costs, benefits and suitability of various adaptation options.
- Establish monitoring indicators of climate risks, thresholds and acceptable coping ranges at the sector and project level. This can contribute to improved climate risk management and planning.
- Develop tools for rapid assessment of the vulnerability of a water utility to climate change.
- Generate hydrological and hydro-geological information for planning future water supplies under climate change.

Associated WSS Adaptation Benefits: Greater water security is achieved under uncertain current and future water availability and other climate changes. Impacts on health due to water-borne and transmitted diseases are minimized under more extreme climatic conditions.

Alignment with GEF and National Objectives

The proposed sub-project will support the implementation of NAPA Priority #2. Water Resources: Promotion of Integrated Water Resource Management (IWRM) to guarantee water access for food production, sanitary uses, ecosystems and industry development. This can include: 1. building climate proofed and environmentally sustainable infrastructure to protect water sources (springs, streams, wells, etc.), 2. providing safe water supply during climate change extreme event periods, 3. enhanced Government and community strategies on responding to drought exacerbated by climate change and, 4. the creation and enhancement of water harvesting models (capture and storage) and water distribution system as well as management system at all levels to avoid water shortage due to climate change.

The sub-project will support the introduction of comprehensive integrated water resource management, including climate change impacts, in the urban areas of Dili, Manatuto and Pante Makassar. A number of areas can be examined to reduce immediate and long-term vulnerability of water resources such as planning and operating water sector programs to ensure sustainability of ground-water resources, increasing water efficiency, strengthening maintenance especially during floods and droughts, and designing water supply and sanitation systems to operate under greater climate variations. Budget support is increasingly being used as the financing model in Timor-Leste and there may be opportunity to test this approach through this program.

Project Component	Expected Outcomes	Expected Outputs	Indicative Financing (\$)	Indicative CoFinancing (\$)
Component 1. Enabling Adaptation through improved decision-making and knowledge development	1.1 Investment frameworks and decision making methodologies support climate change adaptation	1.1.1 Improved decision making processes critical for budgetary allocations for adaptation in WSS 1.1.2 Detailed impact and vulnerability information specific to infrastructure needs for WSS 1.1.3 Revised policies and investment plans to include climate change adaptation WSS (CCA-1, CCA-2)	60,000	75,000
Component 2. Strengthening the climate resilience of infrastructure	2.1 Strengthened adaptive capacity to reduce losses due to climate change impacts	2.1.3 Implementation sector wide measures to reduce vulnerability of urban water supplies in Timor-Leste (CCA-1, CCA-2)	2,640,000	5,625,000
Component 3. Reducing vulnerability through green infrastructure	3.1 Increased deployment of no-regrets risk reduction activities to reduce the vulnerability of infrastructure investments to climate impacts	3.1.1 Green-infrastructure integrated into urban planning and piloted to reduce WSS vulnerability. (CCA-1, CCA-2)	200,000	50,000
SUB-TOTAL			2,900,000	5,750,000
Project Management Cost			100,000	250,000
Total Project Costs			3,000,000	6,000,000
Project Preparatory Grant (PPG)			40,000	-
Grand Total			3,040,000	6,000,000

Sub-Project 3. Up-scaling climate-proofing in the transport sector in TIMOR-LESTE: Sector wide approaches

Current Situation and Baseline Project

Infrastructure (electricity, roads and bridges, water and sanitation) has also been identified by the government, in its Strategic Development Plan (SDP), 2011–2030, as the top development priority for 2011, as it was in 2010. Substantial funds have been set aside in the 2011 budget for infrastructure (via establishment of the Infrastructure Fund), and the government has committed to maintain funding for infrastructure at a high level to 2015. The Indonesian withdrawal in 1999 resulted in extensive destruction of Timor-Leste’s infrastructure. Since this time, addressing the huge infrastructural constraints has been on the Government of Timor-Leste (GoTL) agenda but given the extent of destruction along with the particular geographical circumstances in the country this has been expensive. Such difficulties include the mountainous terrain and the construction of roads along the sea where they are more exposed to the elements and erosion. These systems are also particularly vulnerable to climate changes as they are fragile ecosystems. Future plans foresee significant investment in infrastructure – roads, ports, airports, communications and electricity.

Baseline Project

The government’s priority actions in infrastructure include (i) the rehabilitation or upgrade of all national and district roads by 2020, and rehabilitation of all rural roads by 2015; (ii) the provision of access to clean water and improved sanitation for all by 2030; (iii) the establishment of new port facilities in Dili and on the south coast by 2020; (iv) the upgrade of the national airport and rehabilitation of district airports by 2015; (v) the provision of electricity to all by 2015; and (vi) a competitive telecommunications market and comprehensive mobile phone and internet coverage by 2015. The proposed LDCF program will be in support of the government’s top two priorities for infrastructure.

ADB support for road transport will continue for a long-term approach to the rehabilitation, upgrading, and maintenance of the core road network. The emphasis will be on investment projects that are of national significance and provide an inclusive pattern of economic growth, particularly by improving the transport links needed by agriculture and the rural economy. Support for road maintenance, strengthening government agencies and their staff, and national and community-based contractors will remain priorities. Road safety and public transport will receive increased attention. The ADB transport program will progress from support of the rehabilitation of roads to the upgrade of key roads. The expected project outcome will be a more reliable and safer road network provided by the Ministry of Public Works. The project outputs are: (i) upgrade and climate-proof national roads. About 117 km of roads will be upgraded to a climate-resilient standard including priority roads of 81 km from Manatuto to Natarbora.; (ii) Prepare detailed designs for future priority road links. Detailed engineering design and social and environmental due diligence will be prepared for about 169 km of national roads; (iii) expand performance-based road maintenance. The civil works contractors will maintain the upgraded road sections for 2 years after physical completion. Local contractors will be trained in performance maintenance, and performance-based contracts will be used for future maintenance; (iv) generate awareness of road safety and transport-related social issues. A community-based road safety awareness program, including education for schools, drivers, road users, communities, and HIV/AIDS prevention will be carried out. A multiyear national road safety action plan will be initiated; and (v) provide project management support.

Table III:1. Timor-Leste Baseline Project and NAPA priority

Name of ADB Project*	Year	Sector	EA	Total expected baseline financing	Related NAPA Priority
2. Road Network Upgrading Sector Project	2012	Transport	Ministry of Transport	39.00 million	<i>NAPA Priority #7: Physical Infrastructure: Improved Regulations and Standards for Climate-resilient Infrastructure</i>

Proposed GEF-funded Project

The proposed program will evaluate and finance the incremental costs of protecting roads which run along highly vulnerable mountainous ecosystems and coastal low-lands. While the detailed adaptation options will be defined during the project design, potential additional road sector adaptation activities and benefits include:

- Protecting key facilities against extreme weather events
- Retrofitting structures to ensure appropriate protection, redesign or relocation of road facilities
- Increased attention to temperature variations as a factor in the selection of asphalt cements (and asphalt emulsions for surface-treated roads to maintain pavement integrity)
- Drainage capacities can be increased to accommodate more intense rainfall and erosion events
- Adoption of environmental measures to help conserve fauna and flora, like protecting and enhancing migration corridors to allow species to migrate as climate changes
- Special attention to transport and road infrastructure systems that are inappropriate to the given topography (e.g. subject to damage by landslides, sea-level rise or flooding due to climate change)
- Promoting shore protection techniques that do not destroy surrounding habitat.
- Improving early warning systems and flood hazard mapping for storms and geotechnical risks

Other Adaptation Measures that can protect road assets:

- Undertake vulnerability and impact assessments as input into master planning for the transport sector to ensure protection of infrastructure, minimize the creation of vulnerability, and ensure mobility goals can be met
- Improve integrated spatial planning to ensure that road alignments and adjacent critical ecosystems which serve as buffers against floods, droughts, earthquakes and other extreme events are maintained and protected
- Ensure road networks that provide access to hospitals and evacuation centres, distribution of medical supplies especially during emergencies

Associated Road Adaptation Benefits: Reduced financial burden to governments for maintaining at risk roads, more secure access to markets and public services, reduced damages to surrounding land and loss of life due to reduced road safety due to floods and reduced visibility and traction.

Alignment with GEF and National Objectives

The sub-project will contribute to implementing NAPA Priority #7: Physical Infrastructure: Improved Regulations and Standards for Climate-resilient Infrastructure, including: 1. review of existing laws, regulations and standards to enhance CC-resilience of critical infrastructure and 2. passing new legislation to strengthen and guarantee national development through improved regulation of the quality of materials, adapted building codes and practices and law enforcement.

Project Component	Expected Outcomes	Expected Outputs	Indicative Financing (\$)	Indicative CoFinancing (\$)
Component 1. Enabling Adaptation through improved decision-making and knowledge development	1.1 Investment frameworks and decision making methodologies support climate change adaptation	1.1.1 Improved decision making processes critical for budgetary allocations for adaptation of roads 1.1.2 Detailed impact and vulnerability information specific to infrastructure needs for road infrastructure 1.1.3 Revised policies and investment plans to include climate change adaptation for roads (CCA-1, CCA-2)	45,000	1,000,000
Component 2. Strengthening the climate resilience of infrastructure	2.1 Strengthened adaptive capacity to reduce losses due to climate change impacts	2.1.4 Upscaling of adaptation strategies to protect roads from damages from climate change in Timor-Leste (CCA-1, CCA-2)	4,160,000	35,550,000
Component 3. Reducing vulnerability through green infrastructure	3.1 Increased deployment of no-regrets risk reduction activities to reduce the vulnerability of infrastructure investments to climate impacts	3.1.1 Green-infrastructure integrated road planning and maintenance (CCA-1, CCA-2)	195,000	2,000,000
SUB-TOTAL			4,400,000	38,550,000
Project Management Cost			100,000	450,000
Total Project Costs			4,500,000	39,000,000
Project Preparatory Grant (PPG)			60,000	-
Grand Total			4,560,000	39,000,000

Sub-Project 4. Infrastructure Prioritization, Planning and Budgeting for Adaptation in TUVALU

Current Situation and Baseline Project

The NAPA highlights that a change in climate averages has already occurred in the South Pacific's Climate from the mid-1970, and Tuvalu has become drier and sunnier. More severe weather such as frequent storms will stress infrastructures such as roads and housing, including sectors such as electricity, water, agriculture, fisheries, health, etc., which are vulnerable, and are also more expensive to repair and maintain.

The vulnerability of communities to impacts climate change, sea level rise and extreme event is expected to increase due to the lack of national economic resources and limited investment capacity, the high dependency of communities on natural resources, and the lack of institutional capacity to address climate change. The vulnerability of communities is unvarying across the islands due to the similar location of community villages, including important infrastructure on the coastal zone.

In the last decades significant infrastructure developments have taken place, particularly building facilities on Funafuti such as the Central Princess Margaret Hospital, the Vaiaku Lagi Hotel, the Central Government Office and Nauti Primary School Classrooms. Replicas of the later have also been duplicated on some of the outer islands. In addition, road infrastructure has been put in place which has increased connectivity of rural communities with the main settlement and urban center. The cost for construction and maintenance of these infrastructures is already very high, also because of the lack of adequate local construction expertise to maintain these. Tuvalu is further concerned by the increased maintenance costs of infrastructure as a result of their vulnerability to climate change. These barriers to adaptation are made worse by indiscriminate building in the private sector and lack of a national building code (currently approved in principle), which highlights the fact that most of the private residential and private sector buildings are vulnerable to extreme events as they are often inappropriately located and designed.

Baseline Project

The ADB Pacific Approach recognizes that in a micro-economy such as Tuvalu, poor expenditure allocation decisions have significant opportunity costs that impede development and growth. For this reason, the focus of support to Tuvalu is on improving public sector management and the environment for private sector development. Support will be provided for strengthening budget management and implementing public enterprise reforms. Strengthening of public sector management will also provide fiscal space to enable policy makers respond to future exogenous shocks when these occur. Tuvalu's Country Operations Business Plan (COBP) is consistent with the Pacific Approach and its drivers of change.

ADB does not currently have planned "hard" infrastructure projects in Tuvalu. However, the government has expressed interest in participating in this program for support to address their urgent and immediate adaptation needs. In particular, sub-project will support achievement of the Tuvalu National Strategic Action Plan for Climate Change and Disaster Risk Management (2012–2016) and specifically Goal 4: Developing and maintaining Tuvalu's infrastructure to withstand climate change impacts, climate variability, disaster risks and climate change projection.

The sub-project for Tuvalu will therefore be fairly innovative in that it will seek to incorporate adaptation into broader infrastructure planning, prioritization and budgeting process. It is at these earliest stages that very profound changes can be made to how infrastructure is planned, by, for example, ensuring that building codes and land zoning is appropriate to projected sea-level rise, in the case of small islands such as Tuvalu. Tuvalu's first NAPA priority relates to coastal zone protection. In identifying their

vulnerabilities for this priority, they identified the high level of vulnerability of coastal infrastructure as important to communities which are largely concentrated along the coastal zone.

The baseline project for Tuvalu will therefore be through the Pacific Region Infrastructure Facility (PRIF), which is a multi-partner infrastructure coordination and financing mechanism. It was initiated in 2008 by the Asian Development Bank (ADB), the Australian Aid Program (AAP), the New Zealand Government via the New Zealand Aid Programme (NZMFAT), and the World Bank Group (WBG). The European Commission (EC) and the European Investment Bank (EIB) became members of the joint initiative in 2010.

The PRIF has recently supported Tuvalu to prepare an Infrastructure Strategy and Investment Plan (TISIP), which assists the central government to identify, prioritize and budget for key infrastructure projects, and is prepared iteratively. The TISIP was approved by the Government of Tuvalu in 2012. The *objective* of the work is to embed climate change adaptation activities within the Government’s needs, strategies, policies, and immediate priorities in the infrastructure sector (as identified in the TISIP) as well as identify the financial resources to support their realization. The immediate *output* will be an Annex to the TISIP that provides focus on required climate change adaptation investments to build resilience within infrastructure planning and operation. PRIF management has confirmed support for this project and together with the government of Tuvalu believe it to be fundamental to directing future investments towards reducing vulnerability to climate change.

Table IV:1. Tuvalu Baseline Projects and NAPA priorities

Name of ADB/PRIF Project	Year	Sector	EA	Total expected baseline financing	Related NAPA Priority
1. Infrastructure Strategy and Investment Plan	2013	Water Supply and Sanitation	Department of Planning and Budget, Ministry of Finance and Economic Development (MFED)	220,000	NAPA Priority #1. Increasing resilience of Coastal Areas and Community Settlement to climate change.

Proposed GEF-funded Project

The proposed sub-project will seek to incorporate climate change adaptation needs into the infrastructure prioritization and budgeting process. The activities are targeted therefore at the policy level but require important capacity building efforts as well as monitoring and evaluation of the effects of the project activities. There are very few examples globally where adaptation is being integrated at such high level of the decision-making process and there will be much to learn from this exercise. The project will also include a review and amendments to the building codes, and strengthened implementation capacity to enforce measures which will reduce the vulnerability of the coastline and associated assets.

Alignment with GEF and National Objectives

The proposed sub-project will contribute to implementing NAPA Priority #1. Increasing resilience of Coastal Areas and Community Settlement to climate change. The proposed program will support Tuvalu to protect its coastal communities and infrastructure by directing investments towards projects which reduce vulnerability to climate change, particularly to sea-level rise and associated storms and impacts. In preparing its NAPA, the government identified a number of barriers to protecting coastal communities

such as lack of building codes and norms for infrastructure. This is in addition to overall environmental degradation which makes the coast even more vulnerable. The project will work at the highest levels of government to effect significant changes to decision making and budgeting process in light of climate change priorities.

Project Component	Expected Outcomes	Expected Outputs	Indicative Financing (\$)	Indicative CoFinancing (\$)
Component 1. Enabling Adaptation through improved decision-making and knowledge development	1.1 Investment frameworks and decision making methodologies support climate change adaptation	<p>1.1.1 Improved decision making processes critical for reducing vulnerability to climate change</p> <p>1.1.2 Detailed impact and vulnerability information specific to infrastructure including siting, alignment, and design.</p> <p>1.1.3 Revised policies and investment plans to include climate change adaptation and to take advantage of potential opportunities.</p> <p>(CCA-1, CCA-2)</p>	455,000	200,000
SUB-TOTAL			455,000	200,000
Project Management Cost			45,000	20,000
Total Project Costs			500,000	220,000
Project Preparatory Grant (PPG)			50,000	-
Grand Total			550,000	220,000

LIST OF PROJECTS UNDER THE PROGRAM FRAMEWORK

Projects Submitted for Council approval in this work program + Future submissions:						
<u>Project Title</u>	<u>GEF Amount (\$)</u>			<u>Agency Fee (\$)</u>	<u>Total (\$)</u>	<u>Expected Submission Date</u>
	<u>Focal Area 1</u>	<u>Focal Area 2</u>	<u>TOTAL</u>			
	<u>Project</u>	<u>Project</u>	<u>Project</u>			
FSP submitted with PFD in the work program						
1.Urban Development Project, Phase II Greater Port Vila And Luganville (Vanuatu)	5,750,000		5,750,000	460,000	6,210,000	Same as program framework document
2.District Capital Water Supply Project (Timor Leste)	3,040,000		3,040,000	243,200	3,283,200	
3.Road Network Upgrading Sector Project (Timor Leste)	4,560,000		4,560,000	364,800	4,924,800	
4.			0		0	
Total	13,350,000	0	13,350,000	1,068,000	14,418,000	
MSPs Submitted for CEO approval						
1.. Infrastructure Strategy And Investment Plan (Tuvalu)	550,000		550,000	44,000	594,000	
2.			0		0	
3.			0		0	
Total	550,000	0	550,000	44,000	594,000	
FSP Projects to be submitted in future work programs:						
1.			0		0	
2.			0		0	
3.			0		0	
4.			0		0	
Total FSPs	0	0	0	0	0	
MSP Projects to be submitted for CEO Approval						
1.			0		0	

2.			0		0	
3.			0		0	
4.			0		0	
Total	0	0	0	0	0	

Note: Qualifying GEF Agencies submitting the PFD do not need to fill this table. For all other GEF Agencies, fill in the focal area split, if any. If more than two focal areas involved, add columns as necessary.