



GEF-6 REQUEST FOR PROJECT ENDORSEMENT/APPROVAL

PROJECT TYPE: Full-sized Project

TYPE OF TRUST FUND: Least Developed Countries Fund

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PART I: PROJECT INFORMATION

Project Title: Building shoreline resilience of Timor-Leste to protect local communities and their livelihoods			
Country(ies):	Timor-Leste	GEF Project ID: ¹	5671
GEF Agency(ies):	UNDP	GEF Agency Project ID:	5330
Other Executing Partner(s):	UNDP	Submission Date:	30-Dec-15
		Resubmission Date:	21 Mar 16
GEF Focal Area (s):	Climate Change	Project Duration (Months)	48
Integrated Approach Pilot	IAP-Cities <input type="checkbox"/> IAP-Commodities <input type="checkbox"/> IAP-Food Security <input type="checkbox"/>	Corporate Program: SGP <input type="checkbox"/>	
Name of Parent Program	N/A	Agency Fee (\$)	665,000

A. FOCAL AREA STRATEGY FRAMEWORK AND OTHER PROGRAM STRATEGIES²

Focal Area Objectives/Programs	Focal Area Outcomes	Trust Fund	(in \$)	
			GEF Project Financing	Co-financing
CCA-1	Outcome 1.1 Vulnerability of physical assets and natural systems reduced	LDCF	4,160,000	18,880,000
CCA-1	Outcome 1.2 Livelihoods and sources of income of vulnerable populations diversified and strengthened	LDCF	2,100,000	10,114,402
CCA-2	Outcome 2.2 Access to improved climate information and early-warning systems enhanced at regional, national, sub-national and local levels	LDCF	200,000	500,000
CCA-3	Outcome 3.2 Regional, national and sector-wide policies, plan and processes developed and strengthened to identify, prioritize and integrate adaptation strategies	LDCF	540,000	2,150,000
Total project costs			7,000,000	31,644,402

¹ Project ID number remains the same as the assigned PIF number.

² When completing Table A, refer to the excerpts on [GEF 6 Results Frameworks for GETF, LDCF and SCCF](#).
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B. PROJECT DESCRIPTION SUMMARY

Project Objective: To strengthen resilience of coastal communities by the introduction of nature-based approaches to coastal protection						
Project Components/ Programs	Financing Type ³	Project Outcomes	Project Outputs	Trust Fund	(in \$)	
					GEF Project Financing	Confirmed Co-financing
Climate resilient coastal management framework	TA	<u>Outcome 1:</u> Policy framework and institutional capacity for climate resilient coastal management established	1.1. A comprehensive coastal management and adaptation plan developed and budgeted for the entire coast of Timor-Leste (as part and a direct contribution to NAP) 1.2. Coastal protection and resilience strategy for infrastructure planning, adopted and budgeted 1.3. Technical skills (through specialized trainings), hardware (at least two sets of hydro-meteorological stations and wave gauges), methods (economic valuation and cost-benefit analysis), solid value-chain analysis of livelihood options, and software introduced to monitor climate change induced coastal change and to plan management responses at policy levels. 1.4. Forestry, Protected Areas, Aquaculture and Fisheries Directorates under the Ministry of Agriculture and Fisheries have their roles, coordination, and planning mechanisms clarified and enforced for improved management of mangrove and other critical coastal habitats (as emerges from NAP consultation process)	LDCF	700,000	2,500,000
Climate resilient coastal livelihood	INV	<u>Outcome 2:</u> Mangrove-supportive livelihoods established to incentivize mangrove rehabilitation and protection	2.1. At least 1000 ha of coastal mangroves and wetlands conserved or degraded mangrove areas rehabilitated through natural recruitment and restoration of hydrological regimes both in the northern and southern coasts with a direct employment of local coastal communities • Restore and monitor mangroves, using natural, ecological approaches, including restoration of hydrological regimes, enhanced propagule dispersal and livestock control • Establish maintenance protocols under MAF, with direct participation/employment of coastal communities, particularly women 2.2. Mangrove-supportive, diversified livelihoods/social businesses established in mangrove rehabilitation project sites, benefiting at least 1,000 households and	LDCF	4,000,000	17,604,402

³ Financing type can be either investment or technical assistance.
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			empowering women 2.3. In project site sucos, development plans include mangrove-supportive livelihood support measures benefiting at least 26,000 people			
Landscape level/ nature based coastal adaptation	INV	<u>Outcome 3:</u> Integrated approaches to coastal adaptation adopted to contribute to protection of coastal populations and productive lands	3.1. Upstream watershed replantation demonstrate risk reduction, (including reduction of excessive sediment loads) to downstream coastal waterways and areas 3.2. Coastal wetland restoration and groundwater recharge plans developed and initiated to increase storm water absorption capacity and buffer seawater intrusion 3.3. Based on economic valuation study of ecosystem services, infrastructure offset for coastal protection scheme (and other financial mechanisms, such as payment for ecosystem services - PES) devised to secure financial resources for coastal resilience	LDCF	1,969,000	9,790,000
Subtotal					6,669,000	29,894,402
Project Management Cost (PMC) ⁴				LDCF	331,000	1,750,000
Total Project Costs					7,000,000	31,644,402

C. CONFIRMED SOURCES OF CO-FINANCING FOR THE PROJECT BY NAME AND BY TYPE

Please include evidence for co-financing for the project with this form.

Sources of Co-financing	Name of Co-financier	Type of Cofinancing	Amount (\$)
Recipient Government	Ministry of Agriculture and Forests	Grant	18,000,000
Donor Agency	Korea International Cooperation Agency (KOICA)	Grant	6,000,000
Donor Agency	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)	Grant	2,340,000
Other	WorldFish	Grant	5,304,402
Total Co-financing			31,644,402

D. TRUST FUND RESOURCES REQUESTED BY AGENCY(IES), COUNTRY(IES) AND THE PROGRAMMING OF FUNDS

GEF Agency	Trust Fund	Country Name/Global	Focal Area	Programming of Funds	(in \$)		
					GEF Project Financing (a)	Agency Fee ^{a)} (b) ²	Total (c)=a+b
UNDP	LDCF	Timor-Leste	Climate Change		7,000,000	665,000	7,665,000
Total Grant Resources					7,000,000	665,000	7,665,000

a) Refer to the Fee Policy for GEF Partner Agencies

⁴ For GEF Project Financing up to \$2 million, PMC could be up to 10% of the subtotal; above \$2 million, PMC could be up to 5% of the subtotal. PMC should be charged proportionately to focal areas based on focal area project financing amount in Table D below.

E. PROJECT'S TARGET CONTRIBUTIONS TO GLOBAL ENVIRONMENTAL BENEFITS⁵

Provide the expected project targets as appropriate.

Corporate Results	Replenishment Targets	Project Targets
1. Maintain globally significant biodiversity and the ecosystem goods and services that it provides to society	Improved management of landscapes and seascapes covering 300 million hectares	<i>hectares</i>
2. Sustainable land management in production systems (agriculture, rangelands, and forest landscapes)	120 million hectares under sustainable land management	<i>hectares</i>
3. Promotion of collective management of transboundary water systems and implementation of the full range of policy, legal, and institutional reforms and investments contributing to sustainable use and maintenance of ecosystem services	Water-food-ecosystems security and conjunctive management of surface and groundwater in at least 10 freshwater basins;	<i>Number of freshwater basins</i>
	20% of globally over-exploited fisheries (by volume) moved to more sustainable levels	<i>Percent of fisheries, by volume</i>
4. Support to transformational shifts towards a low-emission and resilient development path	750 million tons of CO ₂ e mitigated (include both direct and indirect)	<i>metric tons</i>
5. Increase in phase-out, disposal and reduction of releases of POPs, ODS, mercury and other chemicals of global concern	Disposal of 80,000 tons of POPs (PCB, obsolete pesticides)	<i>metric tons</i>
	Reduction of 1000 tons of Mercury	<i>metric tons</i>
	Phase-out of 303.44 tons of ODP (HCFC)	<i>ODP tons</i>
6. Enhance capacity of countries to implement MEAs (multilateral environmental agreements) and mainstream into national and sub-national policy, planning financial and legal frameworks	Development and sectoral planning frameworks integrate measurable targets drawn from the MEAs in at least 10 countries	<i>Number of Countries:</i>
	Functional environmental information systems are established to support decision-making in at least 10 countries	<i>Number of Countries:</i>

F. DOES THE PROJECT INCLUDE A “NON-GRANT” INSTRUMENT? No

(If non-grant instruments are used, provide an indicative calendar of expected reflows to your Agency and to the GEF/LDCF/SCCF Trust Fund) in Annex D.

⁵ Update the applicable indicators provided at PIF stage. Progress in programming against these targets for the projects per the *Corporate Results Framework* in the [GEF-6 Programming Directions](#), will be aggregated and reported during mid-term and at the conclusion of the replenishment period.

PART II: PROJECT JUSTIFICATION

A. DESCRIBE ANY CHANGES IN ALIGNMENT WITH THE PROJECT DESIGN WITH THE ORIGINAL PIF⁶

A.1. *Project Description*. Elaborate on: 1) the global environmental and/or adaptation problems, root causes and barriers that need to be addressed; 2) the baseline scenario or any associated baseline projects, 3) the proposed alternative scenario, GEF focal area⁷ strategies, with a brief description of expected outcomes and components of the project, 4) [incremental/additional cost reasoning](#) and expected contributions from the baseline, the GEFTF, LDCF, SCCF, and [co-financing](#); 5) [global environmental benefits](#) (GEFTF) and/or [adaptation benefits](#) (LDCF/SCCF); and 6) innovativeness, sustainability and potential for scaling up.

1) The global environmental and/or adaptation problems, root causes and barriers that need to be addressed

Climate change is causing Timor-Leste to become hotter and drier, with increasingly variable rainfall –water, soils, and coastal areas are all sensitive to these changes⁸. Riverine and catchment runoff from the country's mostly steep terrain, with increasing deforestation and poor agricultural and catchment practices, causes significant soil erosion, increased incidence of landslides and flash flooding. This results in sedimentation of rivers and streams, and major impacts on riverine and coastal water quality, as well as compromises the health and stability of coastal ecosystems, such as mangroves, coral reefs and seagrasses that have significant protective functions for the coastal lands.

These pressures from upland areas, coupled with the rapidly rising sea level, are putting coastal communities and resources upon which they depend, particularly at risk. Over the past 2 decades, mangroves, which serve as a natural defense to the sea, have been severely degraded – leaving the country's shoreline and coastal communities vulnerable to coastal inundation, erosion, salt water intrusion, and impacts of sea-borne natural hazards (e.g. waves, storm surges, and in extreme cases, small scale tsunamis).

The Government of Timor-Leste (GoTL) faces the unique challenge of responding to these climate change impacts, while addressing the needs of a least developed country (LDC) with one of the most rapidly growing populations in the world. Conservative growth rate projections estimate that the population will double to 2.5million over the next 30 years⁹. With approximately 40% of the population living in coastal areas, the GoTL is seeking to minimize adverse impacts of both, climate change and rapid population growth, on shoreline resilience and the achievement of its development goals.

Impact of Climate Change on the Shoreline and Coastal Communities

Sea level rise projections indicate a rise of 3.2-10cm by 2020, 8.9-27.8cm by 2050, and 18-79cm by 2095¹⁰. Recent studies by the Pacific Climate Change Science Programme (PCCSP) indicated that sea level rise near Timor-Leste, measured by satellite altimeters since 1993 and tidal gauges closest to Timor-Leste, is about 9mm per year on average, larger than the global average of 3.2 ± 0.4 mm per year¹¹.

Due to a) tectonic activity, which results in an average annual uplift of 1cm, and b) inadequate data given the lack of tidal gauges, it is difficult to project sea level rise around Timor-Leste with certainty. Nearly all of the uncertainties however indicate that corrections could be for higher rather than lower estimates¹².

Mangrove forests would offer a natural barrier between the sea and coastal communities. The total mangrove area of Timor-Leste has reduced significantly (~80%) from 9,000 to ~1,300ha^{13,14,15}, since 1940, due to both climate and non-

⁶ For questions A.1 –A.7 in Part II, if there are no changes since PIF, no need to respond, please enter “NA” after the respective question.

⁷ For biodiversity projects, in addition to explaining the project's consistency with the biodiversity focal area strategy, objectives and programs, please also describe which [Aichi Target\(s\)](#) the project will directly contribute to achieving..

⁸ Vulnerability to Climate Variability and Change in East Timor, Royal Swedish Academy of Sciences, Ambio, vol. 36, no. 5, (J. Barrett, S. Dessai, RN Jones, 2005)

⁹ 2010 Timor-Leste Population and Housing Census <http://www.statistics.gov.tl/>

¹⁰ National Adaptation Programme of Action (NAPA) on Climate Change (RDTL, 2010)

¹¹ Climate Change in the Pacific: Scientific Assessment and New Research Vol 2. Country Reports (PCCSP, 201?)

¹² National Adaptation Programme of Action (NAPA) on Climate Change (RDTL, 2010)

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climate factors, including sea level rise, increased storm frequency/severity, salt water intrusion, upstream sediment impacts, cutting and felling (for fuel wood and building materials), coastal development¹⁶ and animal grazing – leaving the shoreline and coastal communities exposed to coastal risks of climate change.

Timor-Leste has approximately 747km of coastline and an estimated two-thirds of the population live in coastal areas – this comprises of over 600,000 people residing in coastal and lowland areas with an elevation up to 500m¹⁷. The topography of Timor-Leste exacerbates its vulnerability to climate risks, as over 40% of the country has extremely steep slopes of 40% grade¹⁸, with fragile soils, which are vulnerable to erosion by monsoonal rains – accumulating sedimentation to water catchment areas, and the numerous, short rivers draining to the sea. Increased extreme rainfall events are resulting in increases in natural hazards, such as landslides and flash floods, not only putting pressure on mangroves, but also putting coastal communities at risk.

Coastal communities are therefore especially vulnerable to climate change due to both, sea level rise and natural hazards originating from upland areas in broader coastal watersheds.

Impact of Climate Change on Food Security

As many as 60-70% of households in Timor-Leste are already moderately-to-severely food insecure, particularly between December and February – often termed the ‘hungry season’, when most farmers have exhausted their stock of cereals and are awaiting their next harvest¹⁹. Children are particularly vulnerable, as 47% under the age of five suffer from chronic malnutrition²⁰. Malnutrition weakens the immune system and can lead to a heightened risk of illness and disease. Chronic undernutrition in early childhood also results in diminished cognitive and physical development, which can put children at a disadvantage for the rest of their lives²¹. Research has shown that the effects of chronic malnutrition are irreversible if left untreated by the time a child reaches two or three years of age²².

Agriculture production has not yielded enough, to meet what is required by the growing population²³. While there has been an overall increase in total food production since 2002, imports are still needed to supplement the shortfall²⁴. 80% of the country’s poor and 90% of the rural poor depend on subsistence rain-fed agriculture for their livelihood. Unusual or extreme weather has been cited as the cause for low crop yields (i.e. 25% decrease in rice in 2009 and 20% decrease in maize in 2010)²⁵. Climate change will continue to challenge food security with increasing temperatures and variability in rainfall. The impacts are likely to be particularly acute in the coastal regions where the sea surges, coastal inundation, prolonged submersions, erosion, and long term sea level rise undermine land productivity.

The fifth assessment report (AR5) from the Intergovernmental Panel on Climate Change (IPCC) indicates that temperature in the Southeast Asia sub-region has been increasing at a rate of 0.14°C to 0.20°C per decade since the 1960s, and predicts increases from 0.8°C to 3.2°C by the end of this century. The report further highlights the positive trend in the occurrence of heavy (top 10% by rain amount) and light (bottom 5%) rain events, and the influence of climate change on several large-scale phenomena affecting the region²⁶. Temperature observations in Timor-Leste are

¹³ Global Forest Resources Assessment 2005 Thematic Study on Mangroves – Timor-Leste Country Profile (FAO, 2005)

¹⁴ Marine and Coastal Habitat Mapping in Timor-Leste (North Coast) – Final Report for Tourism & Fisheries Development Project (Boggs, et. al., 2009)

¹⁵ Mangrove Forests of Timor-Leste: Ecology, Degradation and Vulnerability to Climate Change (Alongi, 2014)

¹⁶ Mangrove Ecosystems Strategy, Design and Recommendations for Building shoreline resilience of Timor-Leste to protect local communities and their livelihoods (K. Edyvane, 2015)

¹⁷ National Statistics Directorate 2006: 16

¹⁸ Assessing Environmental Needs and Priorities in East Timor: Final Report. UNDP and Norwegian Institute for Nature Research NINˆ A, Trondheim, Norway (Sandlund, O., Bryceson, I., Carvalho, D., Rio, N., Silva, J. and Silva, M. 2001)

¹⁹ Timor-Leste and FAO Achievements and success stories (FAO, 2011)

²⁰ <https://www.oxfam.org.au/what-we-do/health/food-and-nutrition/childhood-malnutrition-in-timor-leste/>

²¹ Tracking Progress on Child and Maternal Nutrition: A survival and development priority (UNICEF, 2009)

²² <https://www.oxfam.org.au/what-we-do/health/food-and-nutrition/childhood-malnutrition-in-timor-leste/>

²³ Climate Change and Population Growth in Timor Leste: Implications for Food Security (N. Molyneux, et. al, 2011)

²⁴ Timor-Leste and FAO Achievements and success stories (FAO, 2011)

²⁵ Timor-Leste and FAO Achievements and success stories (FAO, 2011)

²⁶ Climate Change 2013: The Physical Science Basis (IPCC, 2013)

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consistent with the high end of the range of the IPCC AR5 temperature trend. Rainfall observations are also consistent with the report; heavy rain events are more common, while the overall average annual rainfall has decreased.

Long Term Solution

To address flooding in coastal areas from sea level rise, the government has built sea walls as a means to protect valuable infrastructure and people. One sea wall has already been established to protect the airport and another to protect the centre of Dili. The trend has therefore favored hard engineering solutions – man-made barriers to prevent or slow the movements of the sea. However, with expansion of coastal urbanization and rise in asset value of a fast developing coastal infrastructure, the government has realized that such approaches are costly, and many are of limited longevity. At the same time, there is a growing realization globally, including in Timor-Leste, that natural ecosystems may be able to perform coastal protection functions more effectively, while at the same time continuing to provide other critical benefits to people – such as food, timber and recreation.

The Timor-Leste Strategic Development Plan (SDP) 2011-2030 also reflects this desired shift, clearly articulating the approach going forward, of preserving an ecological balance to safeguard the sustainable development of the economy. Specifically, the SDP highlights the need to strengthen institutions, policies and action for improved management of coastal zones and related watersheds, including protection of mangrove areas.

Mangroves and other coastal wetlands (i.e. seagrasses and coral reefs) provide physical protection to the shoreline by creating a buffer – protecting coastal communities from sea level rise, and absorbing the impact of waves, storm surges, and in extreme cases, small scale tsunamis. In addition to coastal protection, mangroves and coastal wetlands provide multiple ecosystem services and benefits for coastal communities, such as provisioning services (e.g. timber, fuel wood, and charcoal), regulating services (e.g. protection against floods, storms and erosion control, prevention of saltwater intrusion), habitat (e.g. breeding, spawning and nursery habitat for fish species, biodiversity), and cultural services (e.g. recreation, aesthetic, non-use). Mangroves are also among the most carbon-rich forests in the tropics, storing an immense amount of carbon from the steady accumulation of organic matter over several millennia.

Poor catchment management, deforestation, conversion to agricultural land, and existing inappropriate agriculture practices (e.g. slash and burn and free livestock grazing), have led to a rapid degradation of catchments and watersheds in Timor-Leste and increases in flash-floods, which have downstream impacts on rivers, estuaries and coastal ecosystems, causing more erosion and prolonged coastal inundations. A viable solution to coastal protection must therefore also exhibit the strong connectivity of catchments and coastal ecosystems, by including effective soil conservation and effective watershed management in protecting mangroves and coastal areas. This is especially relevant in Timor-Leste, given the country's steep terrain and extensive deforestation.

Importantly, as all adaptation support in Timor-Leste must be tailored to those most vulnerable²⁷, a long term solution is one which also takes into account the country's food security and poverty challenges. The long term solution can thus be summarized by three complementary outcomes:

- Policy framework and institutional capacity for climate resilient coastal management established
- Mangrove-supportive livelihoods established to incentivize mangrove rehabilitation and protection
- Integrated approaches to coastal adaptation adopted to contribute to protection of coastal populations and productive lands

There are number of barriers however, which can inhibit progress towards this long term solution.

Insufficient Policy Framework and Institutional Capacity for Climate-Resilient Coastal Management

Timor-Leste is a young country, having restored independence in 2002 after 450 years as a colony of Portugal, 24 years of occupation by Indonesia and two years of UN transitional administration²⁸. Though Timor-Leste has a largely oral

²⁷ National Adaptation Programme of Action (NAPA) on Climate Change (RDTL, 2010)

²⁸ National Adaptation Programme of Action (NAPA) on Climate Change (RDTL, 2010)
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tradition, the GoTL is moving swiftly to establish the necessary frameworks and policies which foster development while protecting its natural resources.

In the context of coastal areas management, which are cross-sectoral, there is no obvious lead ministry and a mechanism to facilitate inter-ministerial dialogue is not defined. Decree-Law no. 6/2015 of 11 March 2015 - Organic Law of the VI Constitutional Government, details a revised institutional composition, hierarchy and structure. Responsibilities as they relate to potential impacts on coastal areas are listed below:

- the **Ministry of Agriculture and Fisheries (MAF)** is responsible for promoting agribusiness and fisheries, managing forest resources and water basins; monitoring and supervising fisheries and aquaculture; managing national parks and protected areas; ensuring the protection and conservation of nature and biodiversity; and monitoring the implementation of policies and of activities that are harmful to national fauna and flora
- the **Ministry of Commerce, Industry and the Environment (MCIE)** is responsible for designing, implementing and evaluating the policies for trade, industry and the environment; evaluating and licensing projects for facilities, and the operation of commercial and industrial ventures; promoting, supporting and following-up the strategies to mainstream environmental issues into sectoral policies; undertaking strategic environmental assessments of policies, plans, programmes and legislation and coordinating the environmental impact assessment of project at the national level; and ensuring the adoption and monitoring of measures for the integrated control and prevention of pollution in facilities in general and during the environmental licensing procedures.
- the **Ministry of Planning and Strategic Investments (MPSI)** is responsible for the design, coordination and evaluation of the policies, defined and adopted by the Council of Ministers for the promotion of the country's economic and social development, through strategic and integrated planning and the rationalization of available financial resources. Specifically, the ministry is responsible for the implementation of the Strategic Development Plan, as it pertains to:
 - Infrastructure and urban planning
 - Oil and mineral resources
 - Territorial planning and management
- the **Ministry of Public Works, Transport and Communications (MPW)** is responsible planning and carrying out works aimed at protecting, preserving and repairing bridges, roads, river banks and coastal areas, namely with a view to controlling flooding.
- the **Ministry of Social Solidarity (MSS)** is responsible for proposing and developing policies and strategies to manage the risk of natural disasters; and designing and implementing programmes for managing the risk of natural disasters
- the **Ministry of Tourism, Arts and Culture (MTAC)** is responsible for designing, implementing and evaluating the policy for tourism; contributing to the development of the tourism sector and proposing relevant measures and public policies to that effect; providing opinions on information requests regarding the establishment of tourism ventures; qualifying and classifying tourism-related activities in the tourism sector; qualifying and classifying tourism-related activities in accordance with the law; and implementing and enforcing the legislation regarding the establishment, licensing and supervision of the operating conditions of tourism facilities
- the **Ministry of Justice** is responsible for the design, implementation, coordination, and evaluation of the policies defined and adopted by the Council of Ministers for justice, land and property, law and human rights. This includes organizing the cartography and land register of immovable property.

The pace of development and the ambitious targets of the SDP require effective coordination between ministries to ensure that development planning is conducive to the long term sustainability, including the protection and the continued benefits of Timor-Leste's coastal ecosystems. A national coastal management and adaptation plan could help define this, but there is currently no plan in place.

Within MAF, various directorates are engaged in activities which directly contribute to effective coastal management and to building shoreline resilience. Coordination across directorates with MAF is therefore also important to ensure that the activities of one do not inadvertently affect the goals and targets of another. For instance, the goal of the 2012-GEF6 CEO Endorsement /Approval Template-Sept2015

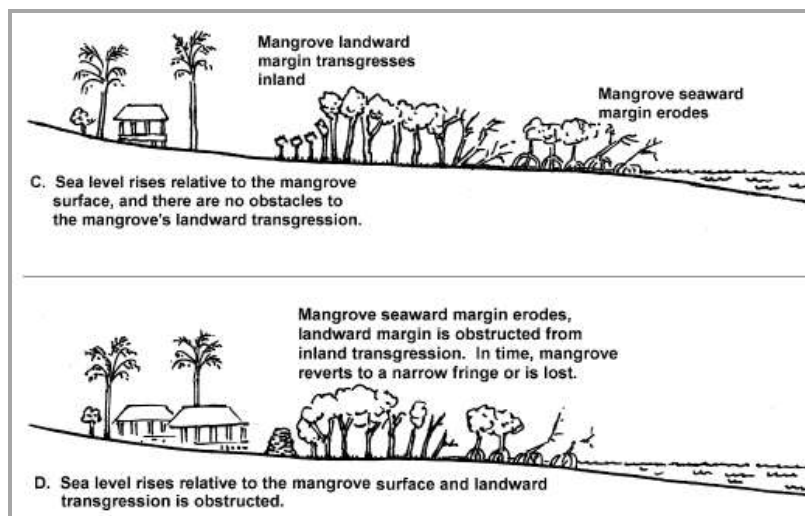
2030 National Aquaculture Development Strategy (NADS) is that by 2030, aquaculture will contribute up to 40% of domestic fish supplies. The strategy seeks to ensure ‘coordination with other line ministries/departments with regard to the use of land and water resources for aquaculture purposes and develop synergistic relationships between aquaculture and other water, land and natural resource management and conservation policies,’ yet NADS does not specifically mention minimizing the impact on mangroves. Further, the National Biodiversity Strategy and Action plan (NBSAP) highlights that mangroves have been removed for the establishment of brackish water shrimp and/or fish ponds. There are a significant number of INGOs, NGOs and faith-based organizations engaged in aquaculture development in Timor-Leste: WorldFish, Caritas Australia, CARE International, Catholic Relief Services (CRS), ChildFund, Hivos and MercyCorps, with financial support from various partners, including AusAID, Australian Department of Foreign Affairs and Trade (DFAT) the European Union (EU), FAO, JICA, NZAid, and USAID. There is not however a cohesive approach across ongoing activities informed by national guidelines, which adequately takes into account the vulnerable shoreline and the need to preserve of mangrove areas.

Maintenance of mangroves areas has been a challenge for MAF, with related public resource allocations remaining too low to undertake enforcement at the national to municipal level. Mangrove rehabilitation efforts have been largely projectized and fragmented – lacking in scale and short-term in nature. There are at least seven identified mangrove species in Timor-Leste, and habitat requirements are specific for each. Effective rehabilitation is complex as it requires an approach tailored to the location, both from a technical and social perspective. Previous rehabilitation efforts have largely failed due to a) lack of financial and human resources to maintain the sites after completion of the project, b) incorrect rehabilitation techniques respective to the site (e.g. species selection, poor understanding of the hydro-ecological requirements of mangroves), c) failure to adequately engage communities in rehabilitation efforts and long term maintenance and/or address community pressures on mangroves and d) ineffective or inadequate education/sensitization for communities on the benefits of mangroves.

Pressure from Rapid Population Growth and Economic Development on Mangroves

Mangroves naturally respond to sea level rise by moving landward, provided there is space and conditions suitable, to thrive. If the mangroves do not have space to move landward, due to development, or are not able to thrive due to human factors (e.g. cutting, felling, etc.), mangrove coverage will diminish and narrow, and will eventually be lost – exposing coastal areas to the sea.

Mangrove Response to Sea Level Rise²⁹



²⁹ Adapted from Figure 1 of Assessment of mangrove response to projected relative sea-level rise and recent historical reconstruction of shoreline position (E. Gilman, J. Ellison, R. Coleman, 2005)
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Mangroves are legally protected under the Biodiversity Decree Law (currently under Parliament review) and UNTAET Regulation No 2000/19 Section 5 – stating that wetlands and mangrove areas shall be protected in Timor-Leste. However, infrastructure development, human settlements, and land use are all contributing to the diminishing or narrowing effect on mangroves in Timor-Leste.

Rapid infrastructure development (including roads, ports and electricity plants), clear forest land and disturb and/or encroach on coastal habitats. Having only recently emerged from conflict, public spending is focused largely on reconstruction and development of critical infrastructure to support economic growth. Per the SDP, the GoTL plans to upgrade about 3,000km of roads and build/upgrade eight ports. Without proper assessments and consideration for coastal vulnerabilities, such large scale construction and expansion of infrastructure networks will inevitably result in the clearing of vegetation, likely contributing to erosion and making the coastal area more exposed and vulnerable.

Rapid population growth and migration towards the coasts in search of livelihood opportunities, as well as a history of conflict and internally displaced people (IDP), have resulted in informal settlements – putting pressure on mangrove areas. While mangroves are protected by regulations, and some sites by protected area status, enforcement is difficult as MAF does not have sufficient financial/human resources to cover the entire country, nor are they able to prevent settlement of communities in protected areas. Spatial planning laws and plans are lacking (though documents are currently in draft form) to prevent settlement in areas vulnerable to coastal flooding, or in areas which need protection to bolster the country's natural defenses. The lack of land tenure and property rights hinders community ownership near mangrove areas or any vested interest in maintaining this common good. Further, employment and income generation potential, associated with mangrove rehabilitation, protection and sustainable management, has not been explored as part of the government programmes, socio development plans, investments or public-private partnership initiatives.

Consultations with coastal communities indicate knowledge of the importance of preserving mangroves to a) protect the coastline from storms and wave surges, b) prevent coastal erosion, and c) reduce saltwater intrusion. Fishing communities especially valued mangroves as breeding areas for reef fish. This was based on their own observations over time, but also indicative of successful efforts by government and development partners to raise awareness. However, mangrove coverage, even in areas where rehabilitation efforts were previously implemented, continues to face pressure from communities.

In addition to being cleared for settlement, communities also use mangroves for fuel wood and boat/home construction. In some cases, it is communities from upland which come to the coast for the wood. As the coastal community is often on public land (i.e. does not own the land), it is in a difficult position to prevent this from happening, even if they acknowledge the importance of mangroves to the coastal ecosystem. Relatively simple approaches to mangrove rehabilitation efforts, such as fencing to keep grazing animals away from mangrove seedlings, has also been difficult to maintain, due to the lack of successful exit strategies of mangrove rehabilitation projects.

Changing land use practices (particularly coastal salt production, coastal aquaculture, coastal rice production and intensification of agriculture,) have also led to a rapid degradation of natural, coastal protective (and shoreline defense) features such as mangrove forests, particularly along the north coast, but also along the southern coast of the country, exposing vulnerable, coastal communities to the risks of slow onset sea-level rise and sudden/extreme storm surges.

While Timor-Leste is an island, the potential for artisanal fishing to supplement the food supply is limited. The types of boats generally owned by communities are unsuitable and unsafe for fishing, due to the steep drop off (upto 3km) beyond the reef. With the very low current levels of fish consumption and fisheries production, aquaculture has been identified as a major national development priority to address food security and malnutrition. To this end, the NADS envisions a strong role for aquaculture, through increasing domestic fish supply and consumption, and sets ambitious national targets for aquaculture development. Under this development strategy, a total area of 2,515ha has already been identified for aquaculture development, with Metinaro, Manatuto, Same, Suai, Bobonaro and Viqueque, being identified as major districts suitable for aquaculture. Several of these sites, particularly Metinaro and Manatuto and Suai, contain some of the largest, mangrove stands in Timor-Leste.

Adaptive Capacity to Respond to Climate Change

The 2014 Human Development Index (HDI) value for Timor-Leste was 0.620, ranking the country at 128 (of 187) on the global list. Peace has provided the needed space for development and growth, resulting in a significant HDI value increase, from 0.465 in 2000. However, 49.9% of the population is still below the poverty line, with women especially affected due to limited opportunities for decision-making and less access to economic opportunities. This is reflected in the stark difference in the purchasing power parity (PPP) between men and women. Per the 2014 HDR, the 2011 estimate gross national income per capita PPP for men was US\$13,582 and only US\$5,634 for women.

As part of PPG activities, a desk review of available research and stakeholder consultations were conducted to identify main areas of concern for women in Timor-Leste (see Annex G.2. of the UNDP project document). These include³⁰:

- Low levels of education and literacy – 37% of women have never been to school, 30% have some primary education, 26% have some secondary education, and 2% have more than secondary education
- Dual workload burden – women are responsible for reproductive work and household duties, but equally responsible for productive work and sale of produce (e.g. from farming)
- High fertility rates and high number of dependent children – 5.7 births per woman
- High maternal and child mortality, and malnutrition particularly of children
- Lack of inheritance and land ownership rights; resulting in
 - Financial dependence on husbands
 - Inability to accumulate financial resources and proceed with potential business ideas
 - Inability to escape domestic abuse and violence³¹
- Low decision making rights in relation to major decisions and assets, within households and within the community;
- Little-to-no acknowledgment of women as drivers of transformational change in the community and in society
- Cultural practices – e.g. *Barlake*, a negotiated contractual agreement between families (monetary or otherwise) for wives, which ultimately determines broader family relationship patterns – including property rights, children's obligations to the family, and the role of women in the household

Approximately 63% of households are engaged in crop production, and 40% live in coastal areas. As climate change continues to impact agricultural production and sea level rise, women will be especially affected due to their weaker economic and social position. These above findings indicate the need for tailored support which responds to the particular needs of women, in order to strengthen overall capacity to respond to climate change.

The country's high birth rate highlights the need to also tailor support to youth and young adults. Timor-Leste has one of the youngest populations in the world; 2/3 of the total population is under 30, 1/2 under 20, and 40% under 15.

This presents an incredible challenge for the GoTL to ensure that for youth and young adults a) public awareness on climate change and critical ecosystems is raised b) related education/training is accessible and c) economic/livelihood opportunities exist. By contrast, a lack of public awareness, access to education, and livelihood alternatives could result in the continuation of unsustainable practices by future generations, leading to further degradation of already fragile ecosystems.

Groups with limited access to economic opportunities, such as women and youth, depend disproportionately on natural resources for their livelihoods, and are the most affected when these resources become degraded³².

³⁰ Gender Report for Building Shoreline Resilience of Timor-Leste to Protect Local Communities and Their Livelihoods (S. Larson, 2015)

³¹ Nationally, more than 38% of women have experienced physical violence, with 28% having experienced violence in the past 12 months. Of women having experienced violence, the husband was the person responsible for 74% of cases. Justification of wife beating is captured in the HDR, and Timor-Leste is among the highest in the world in terms of acceptance, with 86.2% of women and 80.7% of men believing that wife beating is justified in certain circumstances.

³² Regional programme document for Asia and the Pacific 2014-2017 (UNDP, 2014)
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The below table compares 1954-1974 data collected during the Portuguese colonial period, to 2004 -2012 data collected by Agro-meteorology, Land Use and Geographic Information Systems (ALGIS) department in the Ministry of Agriculture and Fisheries (MAF).

Observed Changes in Temperature and Rainfall³³

Location	Alt.	1954-1974			2004-2012			Change in Climate			
		Tmax (°C)	Tmin (°C)	Annual Rain (mm)	Tmax (°C)	Tmin (°C)	Annual Rain (mm)	Δ Tmax (°C)	Δ Tmin (°C)	Δ Ann. Rain (mm)	Δ Rain (%)
Aileu	990	26.0	18.4	1726	28.3	15.0	1383	2.3	-3.3	-343	-20%
Ainaro	809	25.8	16.2	2604	27.8	17.5	2212	2.0	1.3	-392	-15%
Betano	3	-	-	1329	31.7	22.0	1128	-	-	-201	-15%
Dare	492	27.0	21.3	1572	30.1	21.8	1073	3.1	0.6	-499	-32%
Lospalos	394	27.8	19.1	1905	28.9	20.2	1213	1.1	1.0	-693	-36%
Maliana	298	30.9	20.7	2053	33.0	20.9	1315	2.1	0.2	-738	-36%
Manatuto	4	30.1	22.5	570	32.7	22.6	698	2.6	0.2	128	23%
Maubisse	1406	22.3	14.7	1500	22.8	14.3	1031	0.5	-0.4	-469	-31%
Viqueque	108	30.9	21.2	1617	31.3	21.9	1506	0.4	0.7	-111	-7%
Average		27.6	19.2	1653	29.6	19.5	1284	1.7	0.0	-369	-19%

While the degree of change varies by location, the trends of increasing maximum temperatures and decreasing rainfall are present in 8 of the 9 locations. On average there has been an increase in maximum temperature of 1.7°C and a decrease of 19% in average rainfall.

Timor-Leste is also affected by the El Niño Southern Oscillation (ENSO), which brings increased rainfall variability. Historical rainfall data from the Portuguese colonial period of Timor-Leste was analyzed together with historical data on the Southern Oscillation Index. For the 13 district centers analyzed, the annual total rainfall during a La Niña event was 1885 mm compared to the average 1583mm - a 19.1% increase. During an El Niño event, rainfall fell to 1313mm – a 17.0% decrease³⁴. ENSO had a greater impact on rainfall during the transition periods between the wet season and dry season. During La Niña, the wet season starts 22 days earlier on average. During El Niño, the wet season starts 15 days later on average³⁵.

Ongoing ENSO monitoring indicates that the current event could be worse than 1997, which had devastating effects. Southeast Asian countries have been advised to take measures to mitigate its impact – especially for the poor³⁶. Due to the late onset of the rainy season and the decreased rainfall, as historically measured during previous El Niño events, Timor-Leste can expect drier conditions, with impacts on food production and water availability in 2015-2016.

Changes in rainfall and sea level rise, and related salt water intrusion, also impact groundwater quality and recharge rates, as does excessive runoff during the wet season due to deforestation. Groundwater is recharged by rainfall during the wet season, ideally in sufficient amounts for reliable use during the dry season. Without regular recharge, the stored groundwater decreases in volume. Groundwater is a critical resource in Timor-Leste, as a main source of drinking water

³³ Climate Change Research in Timor-Leste, Summary Release, (RDTL, MAF, Seeds of Life, 2013)

³⁴ The Impact of the El Niño Southern Oscillation on Rainfall Variability in Timor-Leste, (MAF, Seeds of Life, 2013)

³⁵ The Impact of the El Niño Southern Oscillation on Rainfall Variability in Timor-Leste, (MAF, Seeds of Life, 2013)

³⁶ <http://edition.cnn.com/2015/08/16/opinions/el-nino-asia-impact/>

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for rural communities and for agricultural activities. Rural villages may have one or two groundwater wells which service the entire community, while many others get their water solely from natural groundwater springs.

Most areas of Timor-Leste oscillate between having surplus water to being water-stressed. During the wet season and in wetter years there are often floods and excess water whereas in the dry season and drier years, there can be areas of water stress, drought and water shortages for consumptive and agricultural use. In these drier times, and to some extent during the wetter periods, surface waters are largely unavailable for use and groundwater is heavily relied on.

Further, as water extraction drops the levels of fresh groundwater, reducing its water pressure and allowing to saltwater to infiltrate and flow further inland. The groundwater in addition to being a critical freshwater reserve for coastal communities, is a natural asset that buffers away saltwater intrusion, provided that extraction is controlled and the reserves kept recharged.

In addition to these stresses, past and continued forest clearing for agriculture, timber and firewood harvesting has led to exposed soils throughout the country. In turn, these exposed soils have eroded quickly causing soil loss, high water turbidity, increased water runoff and increased flash flooding. There is also concern that the high sediment loads could damage estuaries, offshore reefs and wetlands. In many areas high sediment loads can and have made water unfit for human consumption.

Sea level rise, high sedimentation and felling for fuelwood, have all contributed to the large scale mangrove loss in Timor-Leste. This loss not only exposes coastal communities and their assets to climate change induced coastal threats, but also has direct implications on food security. When mangrove forests are destroyed, declines in local fish catch often result. Mangroves maintain fisheries by providing nursing and breeding habitat for fish.

Essential fats from fish are critical for brain development and cognition, particularly in the first 1,000 days of a child's life³⁷. Fish also provide animal protein and micronutrients like vitamin A, iron, zinc and calcium³⁸. As a means to address food security and malnutrition, the GoTL seeks to raise the consumption of fish to 15kg per capita by 2020, from the currently low 6.1kg per capita (less than half the global average). To achieve this goal, rapid development of the aquaculture sector has commenced. If not well planned, however, aquaculture can further accelerate mangrove loss through the clearing of land for coastal ponds, and thus inadvertently reduce the number of fish in coastal areas. Assessments of the links between mangrove forests and the fishery sector suggest that, for every hectare of forest cleared, nearby coastal fisheries lose up to 480kg of fish per year³⁹.

2) the baseline scenario or any associated baseline projects

Policy and Institutional Capacity for Coastal Management

Though Timor-Leste is a young country, the GoTL is moving swiftly to establish the institutional structure and policy frameworks necessary to ensure that development planning is both economically and environmentally sustainable. A lack of institutional leadership, coordinated land use decision-making and finance, however, are currently challenges towards effective coastal management.

Decree-Law no. 6/2015 of 11 March 2015 - Organic Law of the VI Constitutional Government, details a revised composition, hierarchy and structure, to create a more agile State machinery emphasizing efficiency, effectiveness and accountability. The new structure however does not indicate a clear lead ministry for overall shoreline protection or coastal management. MPW is responsible for planning and carrying out works aimed at protecting, preserving and repairing bridges, roads, river banks and coastal areas, namely with a view to controlling flooding'. Issues related to coasts, such as fisheries, protected areas, tourism, environment, and natural disasters, appear in the mandated responsibilities of MAF, MCIE, MTAC, and MSS. The National Adaptation Plan (NAP) process is expected to promote

³⁷ <https://www.devex.com/news/funding-needed-for-fish-farming-in-east-timor-80806>

³⁸ <https://www.devex.com/news/funding-needed-for-fish-farming-in-east-timor-80806>

³⁹ The World's Mangroves 1980 – 2005, A thematic study prepared in the framework of the Global Forest Resources Assessment (FAO, 2005) GEF6 CEO Endorsement /Approval Template-Sept2015

coordination across the ministries related to all adaptation planning and including coastal resilience within established inter-ministerial working groups.

The ambitious targets detailed in the SDP highlight the urgency of inter-ministerial coordination to ensure the conservation and protection of the coast's natural defenses. Consultations during the project preparation stage indicated already increasing pressure on natural shoreline mangroves, from rapid infrastructure development and informal housing settlements. Ad-hoc land allocation decisions in fragile coastal areas, increase pressures and create greater vulnerabilities. Though several mangrove areas already have protected area status, enforcement is difficult due to the lack of zoning regulations in surrounding areas and adequate resources for active monitoring. The Spatial Planning Law will partially remedy this. Article 14, Land Use Plan, seeks to develop and implement the terms of occupancy of any area of the district territory, establishing, inter alia, rules on the deployment of infrastructure and the design, location and integration of urban spaces for collective use, as well as how edification and the discipline of its integration into the landscape. The law further states as one of its guiding principles "the protection and safeguard of natural, cultural and landscape heritage, and namely the coastal areas, the shores of lagoons and rivers and forest lands." Guiding the development of the law and the eventual National Spatial Plan, is a steering committee comprised of senior and technical government officials representing state administration, environment, forests and nature conservation services, housing, public works, transport and communications, tourism, finance, oil and mineral resources, agriculture and fisheries, education, health, security, culture and sports. This inter-ministerial steering committee will likely be maintained to monitor the Spatial Planning Law and the National Spatial Plan, consultation with the committee would benefit any cross-sectoral planning initiatives, such as shoreline protection the development of coastal development guidelines. JICA is providing support to MPW on developing national land use zoning and urban master planning.

Rapid infrastructure development, especially, is putting incredible pressure on Timor-Leste's coastal areas and remaining mangroves. Decree-Law No. 5/2011 of 9 February 2011 on Environmental Licensing creates a system of environmental licensing for public and private projects likely to produce environmental and social impacts on the environment. The law stipulates the need for environmental impact assessments, based on technical studies and consultations with public participation, including identification and assessment of likely impacts, positive and negative, that the project may have on the environment, as well as the environmental management measures designed to avoid, minimize or compensate for adverse impacts expected. The law further stipulates the need for an environmental management plan (EMP) to address the findings of the assessment. Mangroves, specifically, are legally protected under the Biodiversity Decree Law (currently under Parliament review) and UNTAET Regulation No.2000/19 Section 5 – stating that wetlands and mangrove areas shall be protected in East Timor – 5.1) a) the pollution, b) the draining, or c) the destruction, of a naturally existing wetlands and mangrove areas shall be prohibited; and at 5.2) a) the cutting, b) the damaging, or c) the removing of a mangroves shall be prohibited.

There are currently a number of large scale projects which must be well-planned in order to avoid destabilization of foreshores and damage to coastal ecosystems:

- The construction of the **Tibar Bay Port**, which can accommodate international container shipping, was highlighted as a priority in the SDP. This port will eventually replace the port in Dili which is more suited for general cargo. After assessment of potential locations for the port, as well as the option of expanding the existing Dili port, Tibar Bay was selected as the preferred location given the depth/capacity of the bay, proximity to Dili and relative cost. The Scoping Study for the Tibar Bay Port commission by the IFC, acknowledges the impact the port will have on the country's mangroves. Tibar Bay represents approximately 2% of the quickly diminishing mangrove coverage in Timor-Leste⁴⁰ - a significant amount given the large scale loss of mangroves observed in Timor-Leste over time. The bidding process for the Tibar Bay port construction is expected to be completed in 2015, with a thorough environmental impact assessment (EIA) to immediately follow. The EIA will further define the government-required offset, to be executed by the concessioner (i.e. the winner of the bid for construction of the port). While IFC has been engaged in the preparation process, it is not expected to support the GoTL on oversight or technical assistance once the contract to the concessioner is issued.

⁴⁰ Tibar Bay Port - Summary of Environment and Social Scoping Study (IFC, 2013)
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- Similarly, the **Tasi Mane Project**, for supporting growth of the petroleum industry, will also put pressure on fragile coastal and wetland ecosystems. In the Tasi Mane Project's three South coast sites, a number of adjacent mangrove stands are potentially threatened. An extensive EIA was undertaken for the project, however, the recommendations for the EIA have not yet been implemented. This includes further studies on the 'crocodile conservation area and mangrove protected area'. The Tasi Mane Project is comprised the Betano Petroleum Refinery, the Beaçó LNG Plant and the Suai Supply Base⁴¹. Collectively, the development will result in the construction of a sea port (breakwaters and jetties), at least 150km of new highways, upgraded airstrips, and four new towns to accommodate over 22,800 residents.

The expected increase in population surrounding the Tibar Bay Port and the Tasi Mane Project will result in significant changes to existing land uses and will increase the rate of land degradation (i.e. forest/mangrove clearance, erosion, water harvesting). Further, the SDP has planned for extensive road development to accommodate the increased and heavier traffic expected to, and for, these sites. Inter-ministerial coordination is needed to both plan for findings of the EIAs, as well as to identify and implement mitigation measures.

Within MAF, various directorates are engaged in activities which directly contribute to effective coastal management and to building shoreline resilience. To this end, MAF is well-positioned to implement mangrove conservation and integrated coastal management, with its jurisdictional responsibilities for mangroves, fisheries, aquaculture, forestry, agriculture, watersheds and protected areas. Intra-ministerial coordination mechanisms, however, which would ensure that activities of department do not inadvertently affect the goals and targets of another, are lacking. Further, there is not a comprehensive approach across MAF, informed by national guidelines, which adequately takes into account the vulnerable shoreline and the need to preserve of mangrove areas. For instance, the goal of the NADS is that by 2030, aquaculture will contribute up to 40% of domestic fish supplies. The strategy seeks to ensure 'coordination with other line ministries/departments with regard to the use of land and water resources for aquaculture purposes and develop synergistic relationships between aquaculture and other water, land and natural resource management and conservation policies'. The NBSAP highlights that mangroves have been removed for the establishment of brackish water shrimp and/or fish ponds, yet NADS does not specifically mention minimizing the impact on mangroves. Guidelines would not only inform government programmes, but also non-government programmes, to ensure coordination of multiple actors towards common goals. There are a significant number of INGOs, NGOs and faith-based organizations engaged in aquaculture development in Timor-Leste: WorldFish, Caritas Australia, CARE International, Catholic Relief Services (CRS), ChildFund, Hivos and MercyCorps, with financial support various partners, including AusAID, EU, FAO, JICA, NZAid, and USAID.

MAF's Midterm Operation Plan (MTOP) details its five priority programmes: a) sustainable increase in production and productivity b) improved market access and value addition c) improved enabling environment d) organizational development of MAF and e) natural resource conservation and management. Although, the LDCF project responds to most of the above government priorities, the latter constitutes the main programme baseline that the proposed initiative will build upon. This programme fully recognizes that managing the connections between agriculture and natural resources is an integral part of agriculture sector development. The specific investment of US\$18million includes a) integrated crop-livestock-fisheries management practices b) conservation and sustainable management of aquatic and marine resources and c) conservation of biodiversity in forest and coastal areas. The programme will seek the ways to promoting local communities as stewards of their natural environment. This approach may require compensation programmes that are at a nascent stage of consideration, especially related to the establishment of management regimes and strategies for degraded coastal areas, and the protection and conservation of biodiversity in forest and coastal areas. The MTOP falls short of a coherent climate resilience strategy for coastal protection and lacks necessary technical inputs for determining a range of cost-effective adaptation options.

Support for skills development in areas such as economic analysis, which would enable MAF to present stronger proposals based on robust analysis, is currently lacking. This is in part reflected in the limited budget allocated to MAF. While the scope of MAF's work is significant, it only receives 2% of the State budget. Per the Timor-Leste Transparency Portal, the total 2015 budget was US\$1.5trillion, with the allocation to MAF being approximately

⁴¹ This contract has recently been awarded to the South Korean Group, Hyundai.
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US\$26million for all of its programme activities and administrative costs. Stronger funding proposals would improve MAF's ability to secure the necessary resources, both to fulfil its mandate as well as improve long term maintenance/sustainability of interventions.

To support the research and data needs of Timor-Leste, the Centre for Climate Change and Biodiversity was established in 2014, at the National University of Timor-Leste (UNTL). The Centre conducts and houses research on climate related issues and biodiversity conservation. The Centre's mission is to provide policy makers, natural resource managers, and development practitioners with the tools and information needed to develop and implement management strategies that address the impact of climate variability and change on all aspects of socio-economic development and to contain rising greenhouse gases (GHG).

Some data and related monitoring equipment for comprehensive climate risk analysis, however, is lacking in Timor-Leste. The country incurred significant losses to the hydro-meteorological network during its conflict period. There are currently five operational stations in the national meteorological network; this is currently being updated to 19 stations across the country supported by the EU-GCCA programme. The primary climate station is located at Dili Airport, near the nation's capital. Rainfall and air temperature data are available for Dili Airport from 1954-1974 and 2004 to present. This record is 90% complete and homogeneous⁴². Neither systematic tidal measurements nor sea-level rise monitoring are carried out for Timor-Leste in any port of the Pacific or Indian Ocean. This monitoring is necessary to gather knowledge of the long-term implications of sea-level rise on the coastal systems of the country.

Historically, the existing hydro-meteorological observation network had been managed by number of ministries in Timor-Leste. With the recent restructuring, hydro-meteorological monitoring has now been consolidated under MPW. MAF has its own network of 22 weather stations across the country, mostly automated. The data had been kept manually in journals, but has recently been digitized by SoL. The fragmented management of the hydro-meteorological network makes it difficult to have data readily available, especially in digital form to input into the scenario generation or modelling. The limited professional capacity is illustrated by the fact that there are not yet any trained meteorologists in the emerging Bureau of Meteorology; four meteorological observers work at the airport and four geophysical staff in the Bureau with support of six administrative staff.

The EU-GCCA programme to Timor-Leste is providing training to ALGIS in mapping, data interpretation from an agro-ecological perspective and land use management through adapted courses in regional universities. The project will also enable 19 existing weather stations to be fully functional and improve national capacity to monitor and map climate events. Findings and results of data interpretation will be provided to policy makers to support decision-making and the integration of climate change data and related impacts into policies and plans.

There are opportunities to link this important data and relevant analysis to coastal management and adaptation planning. Enhancing this further with economic analysis would also enable the GoTL to make the most cost-effective decisions, after assessing the economic value of natural assets, projected climate change impacts, and national development priorities. For instance, understanding the economic value of mangroves, coastal ecosystems and their coastal protection functions, and the potential impact of climate change on these assets, could result in more risk-informed, climate-resilient and cost-effective development planning.

Mangrove Preservation and Rehabilitation

Timor-Leste has lost an estimated 80% of mangrove area since 1940, leaving approximately ~1,300ha^{43,44,45}, as at 2005. Aerial photos taken in 2014, for ongoing national spatial planning, can be analyzed and compared to historical records to update these figures.

⁴² Climate Change in the Pacific: Scientific Assessment and New Research Vol 2. Country Reports (PCCSP, 201?)

⁴³ Global Forest Resources Assessment 2005 Thematic Study on Mangroves – Timor-Leste Country Profile (FAO, 2005)

⁴⁴ Marine and Coastal Habitat Mapping in Timor-Leste (North Coast) – Final Report for Tourism & Fisheries Development Project (Boggs, et. al., 2009)

⁴⁵ Mangrove Forests of Timor-Leste: Ecology, Degradation and Vulnerability to Climate Change (Alongi, 2014)
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MAF holds site-specific information (e.g. species listings) and regular updates from local enforcement staff, however, a comprehensive baseline is missing. Sites have been identified by district MAF forestry enforcement staff, however, size mapping, quality and biodiversity information is limited. Based on initial surveys undertaken by the PPG team, a number of mangrove stand sites remain undocumented or unaccounted for.

There is currently no system in place that regularly monitors mangrove coverage and related coastal inundation and coastal erosion, nor assesses sediment transport or conducts sediment budget analysis. Several agencies have been involved in local mangrove and coastal habitat mapping and faunal surveys (i.e. Charles Darwin University, Northern Territory Government), and human impacts on mangroves (i.e. Australian Institute of Marine Science (AIMS)), though data on mangrove areas, condition, as well as changes in adjacent community settlements is lacking, particular on the South coast. Critically, field surveys and assessments are required to 'ground truth' satellite imagery and enable mapping of mangrove change and vulnerability. AIMS and Charles Darwin University have undertaken several studies on catchment impacts on coastal mangroves. At the local-scale, surface elevation monitoring is necessary for predicting the survival of mangrove areas and long-term viability of restoration efforts. Knowing this would allow for evidence-based restoration action, by prioritizing management efforts at mangrove sites that offer the best conditions for sustained rehabilitation through natural recruitment process.

There are existing laws protecting mangroves, but enforcement is lacking. Protected areas are a vital component of an integrated coastal adaptation strategy and to building shoreline resilience to climate change. In recognition of the current low representation of mangroves in the national protected areas network, the National Ecological Gap Assessment (NEGA), recommends that 80% of the current distribution of mangroves be protected within protected areas. With the current proposed network of 30 protected areas, nearly 50% of mangroves fall within the proposed network. These proposed areas, include some of the largest stands of mangroves in Timor-Leste, (i.e. Behau (Hera-Metinaro), Lamansak (Manatuto), and Ribeira de Clere/Lake Modo Mahut (Manufahi), Lake Naan Kuro (Natabora)). There is an opportunity for LDCF funding to assist MAF to link and integrate protected area planning initiatives with mangrove conservation and re-forestation and coastal livelihood development.

Rapid ongoing infrastructure development is a concern for planning and long term sustainability of mangrove rehabilitation efforts. For instance, the selected location for the Tibar Bay Port represents approximately 2% of the quickly diminishing mangrove coverage in Timor-Leste⁴⁶ – a significant amount given the large scale loss of mangroves observed in Timor-Leste over time. The offset will be further defined over the next year (with support under Outcome 1), and will include mangrove rehabilitation along the South-eastern shoreline of the bay. Currently, potential offset activities, per the scoping study, include:

- *Avicinea marina* mangrove rehabilitation along the south-eastern shoreline of the bay
- Supporting the protection and management of un-impacted mangrove, sea grass and/or coral reef communities, in areas east of Dili
- Establishment of community-based marine protected areas in the bay, on the coast immediately west of the bay, and at other coastal sites (potentially Hera, Metinaro and Manatuto)

Monoculture regeneration, as detailed above is not considered international best practices to ensure high survival rates. At the moment, however, there are no technical guidelines for mangrove rehabilitation in Timor-Leste, to effectively inform species selection, planting techniques and approaches to long term preservation. Previous efforts of mangrove rehabilitation have therefore been largely unsuccessful. The Haburas Foundation, a local NGO, implemented a 2-year project which included planting 2000 mangroves, of which very few survived. The Haburas Foundation shared its lessons learned with the LDCF project design team, these include:

- Community awareness – more time should have been devoted to social preparation before the plantation of mangroves, stressing the importance of the preservation of mangroves, their coastal protection and livelihood benefits;

⁴⁶ Tibar Bay Port - Summary of Environment and Social Scoping Study (IFC, 2013)
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- Community ownership – community did not feel a sense of ownership, this might be remedied through direct access to finance by the community for regular maintenance of related infrastructure (e.g. for small repairs to fencing to prevent animal grazing)
- Regular engagement by strong project team – engagement with the community by the project was too sporadic, should be more intensive, while taking into account the community dynamic
- Species selection – must ensure that the mangrove species selected is appropriate for the site, and planting method and placement is conducive to its growth.
- Project duration – the project was too short, active and regular maintenance of the replantation area is needed for at least the first 2 years, to ensure seedlings reach maturity
- Effective materials for protection of seedlings – must ensure that fencing materials are resilient to tides and where appropriate, strong enough to deter grazing livestock

Consultations with communities at previous project sites provided further input. Communities expressed concerns over long delays in receiving necessary inputs (e.g. materials to repair fencing which would have deterred grazing animals). Sustainability of payment mechanisms to maintain mangrove areas was also a concern. As funding ended with the project, there was no incentive to continue to protect the project sites. Community-based finance mechanisms may be more successful going forward.

While MAF is responsible for conservation and maintenance of mangrove areas, the geographic scope of this responsibility against the limited number of personnel, make this a daunting task. Further, given community pressures on mangroves areas (e.g. felling for fuel wood), community awareness, cooperation and engagement are necessary to ensure the long term sustainability of mangrove conservation and rehabilitation efforts. MAF resourcing solely, however, is not adequate to implement these practices. While a number of NGOs, local and international exist to assist in the implementation, much of the work needs to be undertaken by the communities themselves, and will require long-term behavior change mechanisms to ensure they are effective.

Mangrove-Based Livelihoods

Pressure from communities is a key driver for mangrove loss in Timor-Leste. Traditional coastal livelihoods, such as salt production, entail cutting mangroves for fuel. There are ongoing efforts to reduce this demand for wood by communities. The GEF-funded *Promoting Sustainable Bio-energy Production from Biomass (SBEPB)*, which began implementation in 2015, promotes sustainable production and utilization of biomass resources to support local economic, environmental and social development. As the project will work in part also in mangrove areas, its activities will relieve the pressure from communities on mangroves for fuel wood. There is opportunity to work collaboratively with this project on relevant sites to maximize the impact of combined resources. UNDP's *Mobilizing Social Business to Accelerate MDGs Achievement in Timor-Leste* is developing a viable social business model for the salt producers of Liquiça – an important mangrove area in the country. Economic analysis conducted as part of project indicated that farmers were able to generate more salt with the introduction of the salt evaporation ponds with reduced physical effort. An observation however to note, from implementation of this project is that during the rainy season, farmers did revert to using mangrove wood to cook the salt to prevent disruptions to household incomes. Further, when additional funds were needed for other reasons, reasons (e.g. *adat* - family and customary ceremonies, food or schooling fees), communities reverted to cooking salt. Given that in practice, many salt-farming communities do not have access to financial management or earn too little to be able to have forward-looking practices, the need for making immediate earnings means that salt-farming by cooking is widespread, despite efforts to shift to evaporation methods, communities in many cases reverted to cooking salt. While salt production is not a livelihood that will be supported by the LDCF project, the social business model of the project has been successful and will be explored for application in the LDCF project. Under Outcome 1, LDCF support will ensure that siting for future investments in salt production consider the need to maintain mangrove areas for coastal protection and maintenance of coastal ecosystem functions.

Timor-Leste's rapidly expanding population is bringing with it development challenges related to both job creation and food security. The NADS envisions a strong role for aquaculture in diversifying and improving livelihoods, and building resilience among rural households and agro-ecological systems. Aquaculture is intended to contribute to increasing fish supply and consumption, with the objective of raising per capita fish consumption in Timor-Leste from 6.1kg to 15.0kg by 2020 (closer to the global average annual per capita consumption of 17.8kg). The expectation is that

aquaculture will by 2030 contribute up to 40% of domestic fish supplies, with the remainder coming from wild capture fisheries.

There are a number of organizations which have contributed, or are contributing, to the development of the aquaculture sector in Timor-Leste.

- WorldFish supported the government in the development of its NADS and is currently working in the provinces of Atauro, Beaco, Vemasse and Baucau. WorldFish adopts an ecosystems approach to aquaculture and includes fish stock and reef damage assessments, market research, small capacity building programme and development of a fish strategy for Timor-Leste. Future activities, with funding from New Zealand Aid, include aquaculture development (i.e. milkfish and tilapia). WorldFish is also researching options for locally-sourced, plant-based fish feed ingredients to support local production of aquaculture inputs.
- Towards the goals detailed in NADS to develop skills in the aquaculture sector, a memorandum of understanding (MoU) has been signed between KOICA and the NDFA to start an aquaculture training center in Liquiça, where 40 people will to be trained per every 9-month cycle. The programme also includes a training-of-trainers programme for communities. The programme is expected to run until 2017-8.
- The Agricultural Cooperative Development International and Volunteers in Overseas Cooperative Assistance (ACDI/VOCA) was awarded a grant from the United States Department of Agriculture (USDA) for a three-year project, to cultivate mud crabs and fish in the coastal villages of Timor-Leste. Until its completion in January 2015, the project operated in five districts and was implemented in collaboration with NDFA and with local and international stakeholders. The Mud Crab and Fish project worked with coastal communities to raise mud crabs in cages partially submerged in coastal mangrove forests. The program also explored sustainable cultivation of other aquaculture products including various fish species. Emphasizing sustainable mangrove use, the Mud Crab and Fish Cultivation project helped establish 85 producer groups in coastal areas to develop and manage crab and fish nurseries. Producers were trained in crab and fish cultivation as well as business and group enterprise skills. Cages, pens, and ponds were built using local materials such as bamboo and palm stalk.
- Several NGOs, IGOs and faith-based organizations are supporting communities on related livelihood activities. MercyCorps is providing training on aquaculture, and seeks to extend its program to 1500 farmers. Caritas Australia's work covers a wide range of issues including climate change adaptation, food and water security, sustainable agriculture, and institutional strengthening of community-based organizations. Activities include training in food processing and the introduction of aquaculture practices in coastal communities, as well as establishing sustainable gardens and tree nurseries using alternative sloping land gardening methods to increase soil fertility, reduce erosion, and increase production.

While previous aquaculture support has had some success, the fragmented nature of interventions and the lack of strong links to markets, have resulted in challenges with sustainability after project closure. For instance, after ACDI/VOCA's initial establishment, growers have struggled to obtain feed and maintain the necessary pH levels for healthy fish, due to costs. Some growers also indicated having to sell fish before they reached maturity, because of financial constraints in the household. There is opportunity to strengthen the aquaculture in Timor-Leste through cost and market analysis, to ensure that growers are able to maintain the ponds, as well as sell their product, after the project close.

Critically, there is a need for salt production and aquaculture site selection to be informed by the products of Outcome 1, to ensure that development does not inadvertently interfere with the goals of mangrove protection and rehabilitation in Timor-Leste.

Integrated Ecosystems and Valuing Ecosystem Services

Pressure on coastal areas is not limited to immediately surrounding areas. Past and continued forest clearing for agriculture, timber and firewood harvesting has led to exposed soils in upland areas. These exposed soils have eroded quickly causing soil loss, high water turbidity, increased water runoff and increased flash flooding. The high sediment loads are damaging estuaries, offshore reefs and wetlands, including mangrove areas. Loss of coastal wetlands disrupts the hydrology that supports mangrove systems, which protect coastal areas from water inundation by slowing and filtrating flows. Moreover, coastal natural ponds, wetlands and marshes act as important storm and flood water storage

facilities, as well as provide protection from erosion, flood and storms and capturing sediment loads – maintaining and purifying water quality.

High sediment loads also make water unfit for human consumption. Associated urban water shortages after heavy rainfall events are regular in some areas⁴⁷. In these situations, when surface water becomes unusable, groundwater is relied on as a primary source of water. At the shoreline, mangroves would buffer seawater intrusion into the aquifers. Aquifers themselves protect against saltwater intrusion provided that water tables are kept at appropriate levels.

Most areas of Timor-Leste oscillate between having short periods of surplus water resources to being water-stressed. During the wet season and in wetter years there are often floods and excess water whereas in the dry season and drier years, there can be areas of water stress, drought and water shortages for consumptive and agricultural use and the natural environment⁴⁸. In these drier times, and to some extent during the wetter periods, surface waters are largely unavailable for use and groundwater is heavily relied on. Rainfall variability due to climate change, as well as the growing population and related increasing demand for water, will further exacerbate this.

Current predictions for the end of 2015, indicate that Timor-Leste is entering into ENSO affected period that will likely result in severe water-shortages. Protection of water resources is of major importance for the GoTL – with the MSS, MAF and MCIE currently trying to coordinate efforts to respond to El Niño and protect water resources.

Water supply and water management policies are currently under review with the Council of Ministers. Water use, however, is not widely monitored, and only large commercial users are charged for the supply. There are no licensing arrangements with agricultural users nor is there currently regulation of, or fees imposed on, those who release wastewater into the river systems. Improved understanding and management of both the surface-water and groundwater resources of Timor-Leste is required to ensure there are not water shortages in any sector, including environmental water uses, into the future.

The EU-GCCA programme is providing support to communities in assessing the best climate-adapted options at local level and integrating them into existing planning processes. The programme will support communities in drafting local soil and water conservation plans. For this purpose, environmental profiles of the five major watersheds will first be prepared, using participatory processes for assessing climate change effects on communities. Specific attention will be paid to degraded areas, the protection of water catchment areas and the potential for soil and water conservation techniques. The identification of conflict mitigating measures will be an integral part of the process. The resulting soil and water conservation plans will be integrated into suco and district development plans.

Data is available for geological layers for Timor-Leste, but not the water table. BESIK (Bee, Saneamentu no Ijiene iha Komunidade), with funding from Australian Aid/DFAT, has conducted analysis in Liquiça to regularly measure depth and salinity of groundwater. This has included training of extension officers to monitor water levels using accessible technologies (i.e. electric tape tools) and regularly report findings. The results of the project will be a database and map of water quality.

Long-term resilience of coastal areas demands comprehensive approaches that examine and address risk acceleration factors at a broader coastal landscape and catchment area. Sustainable finance is needed to plan and implement these comprehensive approaches; however, public revenue streams in Timor-Leste are currently not reliable in the long term.

The majority of the State Budget is financed by the Petroleum Fund. The Petroleum Fund is held in the Central Bank of Timor-Leste, administered by Ministry of Finance. All petroleum income initially enters the Fund before any transfers are made to the State Budget. The amount of the transfer to the State Budget is guided by Estimated Sustainable Income (ESI), set at 3% of total petroleum wealth. The rationale behind using the ESI is to regulate spending of temporarily high petroleum income, shield against the volatility of petroleum inflows, and safeguard a sustainable use of public

⁴⁷ Mangrove Ecosystems Strategy, Design and Recommendations for Building shoreline resilience of Timor-Leste to protect local communities and their livelihoods (K. Edyvane, 2015)

⁴⁸ Mangrove Ecosystems Strategy, Design and Recommendations for Building shoreline resilience of Timor-Leste to protect local communities and their livelihoods (K. Edyvane, 2015)

finances. The Petroleum Fund has increased considerably since it was established in 2005. During 2013, petroleum revenues and net investment return added \$3,042million and \$865million to the Fund, respectively, while withdrawals subtracted \$730million. These, however, are believed to be peak figures. Analysis factoring in falling oil production, and changes in the global oil market prices, indicate that the Petroleum Fund may be exhausted by as early as 2024⁴⁹. The current means of financing the State Budget is therefore not sustainable; Ministries must identify additional revenue streams to support planned activities.

The tourism sector in Timor-Leste is one with great economic promise. By 2030, the GoTL seeks to have a well-developed tourism industry attracting a large number of international visitors – contributing substantially to national and local community income, creating jobs throughout the country⁵⁰. The tourism industry is currently in its early stage of development. As part of the Coral Triangle, however, Timor-Leste has potential to develop a niche market in the area of eco- and marine tourism. The Coral Triangle is a global center of marine biodiversity. It is home to 75% of all known coral species, more than 3,000 species of reef fish, six of the seven turtle species, whale sharks, manta rays and a diversity of marine mammals such as 22 species of dolphin, and a variety of whale species⁵¹.

Rehabilitation of mangrove areas directly benefits coral reefs, and thus this nascent tourism sector. Coastal wetlands, especially mangroves, supply energy and nutrients to coral reefs and maintain fisheries by providing nursing and breeding habitat. Further, mangroves buffer marine ecosystems from terrestrial sedimentation and pollutants⁵². There are unexplored opportunities to link tourism revenue to mangrove rehabilitation and preservation efforts for long term sustainability.

Given the wide array of benefits provided by mangroves, there is great potential to identify revenue streams based on economic valuation, to support the long term sustainability of protection and re-forestation efforts.

3) the proposed alternative scenario, GEF focal area⁵³ strategies, with a brief description of expected outcomes and components of the project

The outcome/output structure of the project is consistent with the PIF. Wording has been refined slightly for clarity purposes. For example, Outcome 2 the wording has changed from “mangrove-based” to “mangrove-supportive”. There has also been a change in the budget allocation across outcomes, though the total budget remains the same. Outcome 1 has been reduced slightly to \$700,000 from \$1,100,000, with the balance being transferred to Outcome 3. This reflects the expressed and observed need for small-scale reforestation and land works, such as contour/swale building and small scale bio-engineering for reducing runoff and soil loss. Additional investment in these activities not only prevents excessive erosion from burying mangroves at project sites, but also enhances water access for agricultural and agro-forestry use, as well as for community use through springs.

Research and consultations during the PPG have resulted in greater detail as to the climate change impacts faced by Timor-Leste, socio-economic challenges at the national and community levels, and the country’s development priorities. These have informed project design. The project structure and additional information about interventions is detailed below. Activity level detail can be found in the UNDP project document.

⁴⁹ <http://www.laohamutuk.org/Oil/PetFund/05PFIndex.htm> (Accessed 8 June 2015)

⁵⁰ Timor-Leste Strategic Development Plan 2011-2030 (RDTL, 2010)

⁵¹ Mangrove Ecosystems Strategy, Design and Recommendations for Building shoreline resilience of Timor-Leste to protect local communities and their livelihoods (K. Edyvane, 2015)

⁵² Mangrove Ecosystems Strategy, Design and Recommendations for Building shoreline resilience of Timor-Leste to protect local communities and their livelihoods (K. Edyvane, 2015)

⁵³ For biodiversity projects, in addition to explaining the project’s consistency with the biodiversity focal area strategy, objectives and programs, please also describe which [Aichi Target\(s\)](#) the project will directly contribute to achieving..

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LDCF Project Objective To strengthen resilience of coastal communities by the introduction of nature-based approaches to coastal protection		
Outcome 1: Policy framework and institutional capacity for climate resilient coastal management established LDCF Budget: \$700,000	Outcome 2: Mangrove-supportive livelihoods established to incentivize mangrove rehabilitation and protection LDCF Budget: \$4,000,000	Outcome 3: Integrated approaches to coastal adaptation adopted to contribute to protection of coastal populations and productive lands LDCF Budget: \$1,969,000
Outputs 1.1. A comprehensive coastal management and adaptation plan developed and budgeted for the entire coast of Timor-Leste (as part and a direct contribution to NAP) 1.2. Coastal protection and resilience strategy for infrastructure planning, adopted and budgeted 1.3. Technical skills (through specialized trainings), hardware (at least two sets of hydro-meteorological stations and wave gauges), methods (economic valuation and cost-benefit analysis), solid value-chain analysis of livelihood options, and software introduced to monitor climate change induced coastal change and to plan management responses at policy levels. 1.4. Forestry, Protected Areas, Aquaculture and Fisheries Directorates under the Ministry of Agriculture and Fisheries have their roles, coordination, and planning mechanisms clarified and enforced for improved management of mangrove and other critical coastal habitats (as emerges from NAP consultation process)	Outputs 2.1. At least 1000 ha of coastal mangroves and wetlands conserved or degraded mangrove areas rehabilitated through natural recruitment and restoration of hydrological regimes both in the northern and southern coasts with a direct employment of local coastal communities <ul style="list-style-type: none"> • Restore and monitor mangroves, using natural, ecological approaches, including restoration of hydrological regimes, enhanced propagule dispersal and livestock control • Establish maintenance protocols under MAF, with direct participation / employment of coastal communities, particularly women 2.2. Mangrove-supportive, diversified livelihoods/social businesses established in mangrove rehabilitation project sites, benefiting at least 1,000 households and empowering women 2.3. In project site sucos, development plans include mangrove-supportive livelihood support measures benefiting at least 26,000 people	Outputs 3.1. Upstream watershed replantation demonstrate risk reduction, (including reduction of excessive sediment loads) to downstream coastal waterways and areas 3.2. Coastal wetland restoration and groundwater recharge plans developed and initiated to increase storm water absorption capacity and buffer seawater intrusion 3.3. Based on economic valuation study of ecosystem services, infrastructure offset for coastal protection scheme (and other financial mechanisms, such as payment for ecosystem services - PES) devised to secure financial resources for coastal resilience

The objective of the project is to strengthen resilience of coastal communities by the introduction of nature-based approaches to coastal protection. The objective is achieved through three complementary outcomes. Outcome 1 focuses on the policy framework and institutional capacity necessary for effective coastal management in the face of climate change. Outcome 2 focuses on rehabilitating mangrove areas to restore Timor-Leste's natural defenses to sea level rise and coastal erosion. Importantly, Outcome 2 also addresses the community pressures on mangrove areas by supporting livelihood alternatives, with particular focus on mangrove-supportive livelihoods, thereby incentivizing coastal communities to protect the essential mangrove stands and become the stewards of these natural defense systems. As pressures on mangroves are not limited to activity in coastal areas, Outcome 3 focuses on the broader landscape to address erosion and excessive runoff from upland areas. Outcome 3 also explores innovative financial mechanisms to ensure long term sustainability of efforts.

Outcome 1: Policy framework and institutional capacity for climate resilient coastal management established

LDCF funds will address identified gaps in institutional frameworks, policy guidance, and related data and technical capacity.

Consistent with the targets of the SDP and the NAPA, a comprehensive coastal management and adaptation plan will be developed, which will include strategies to protect mangroves and coastal watersheds. This will include engagement of MAF, MPW, MSS, MCIE, MPSI, their respective directorates, academia and other stakeholders as necessary. To facilitate this coordination, the inter-ministerial steering committee for the National Spatial Law and Plan, and other relevant technical working groups (e.g. the technical working groups for the National Adaptation Plan (NAP) and Second National Communication (SNC)) will be engaged to ensure discussion and endorsement by the various ministries, which plan and implement activities impacting coastal zones.

The comprehensive coastal management and adaptation plan will clarify and reconcile current gaps, overlaps and inconsistencies in functions and mandates across main institutions. There are some nascent steps taken in this regard that offer the opportunity for the LDCF funding to support and scale up. For example, National Directorate of Fisheries and Aquaculture (NDA) under MAF plans to introduce integrated coastal resources management and ecosystem-based coastal fisheries management around the islands of Atauro Island and Batugade. This can serve as a starting point for a broader shoreline management plan for the Timorese coastline that will introduce a range of cost-effective adaptation strategies across short, medium and long term timescales. This also offers an opportunity to promote greater coherence through forthcoming actions taken for advancing a NAP process to commence in 2015. The UNFCCC focal point in Timor-Leste has requested for such support under the LDCF-funded National Adaptation Plan - Global Support Programme (NAP-GSP). While such actions will be national in nature, coastal management frameworks would be an important component in such national and possibly sub-national planning frameworks.

Significantly, the coastal management and adaptation plan will incorporate various considerations, such as climate change, particularly sea-level rise, and coastal change from climate and non-climate threats and impacts. A national coastal vulnerability assessment will therefore precede development of the plan to identify vulnerable areas and threats.

Given the importance of infrastructure development to support economic growth in Timor-Leste, and the potential impact on coastal areas, LDCF funds will also support development of a coastal protection and resilience strategy for infrastructure planning going forward. This will include support on translating the recommendations of the Tibar Bay Port and Tasi Mane EIAs into activities with costs and responsibilities defined and embedding into the projects' operational plans and environmental and social management plans, in particular related to mangrove and related ecosystem protection/offsets. While infrastructure development is progressing at a rapid pace, it is still in its early stages. To the extent possible, the coastal resilience strategy will be outlined in detail and embedded into the Tibar Bay port construction and operation plan and the Tasi Mane environmental and social management plan. There is therefore, both, an urgent need and a timely opportunity to put in place a framework which will protect coastal areas from infrastructure development for years to come.

With protection measures identified, LDCF will support data collection and technical training. LDCF funds will address data gaps by providing monitoring equipment and training. Tidal gauges at the project sites will provide data which can then further inform coastal mapping efforts, the coastal vulnerability assessment, and thus adaptation planning. Training will be provided to both integrate coastal concerns into adaptation planning, as well as to better secure related finance (e.g. cost-benefit analysis). There are relevant ongoing programmes which can be replicated in Timor-Leste to support policy makers with the skills needed towards efficient and effective coastal planning in light of climate change. The Capacity Building Programme on the Economics of Climate Change Adaptation (ECCA) responds to the consensus reached by participating countries that skills development in economic appraisal methods for climate change impacts on key sectors, including cost-benefit analysis of investment options is required to facilitate a more comprehensive approach to mainstreaming climate change risks into planning processes. The programme is comprised of a series of trainings, interspersed with in-country data collection and economic analysis. The programme is currently near completion and is in the process of packaging its training material, including case studies from countries with similar challenges (i.e. Southeast Asian countries and SIDS from the Asia and Pacific region), into university courses designed for government staff. Similarly IUCN's Mangroves for the Future project is developing course material on the technical issues of coastal management. The LDCF project will link to and build on these efforts, and develop a tailored course(s) for government staff in Timor-Leste. The course(s) will expound on the role of coastal ecosystems to provide critical protection services (i.e. natural barrier between sea and communities, prevention of coastal erosion, buffering saltwater intrusion into the groundwater and inland, habitat for fish, etc.). To ensure that climate risk informed planning is able to

identify climate resilient choices of coastal management and development, skills training will include cost benefit analysis, taking into account the economic value of ecosystem services and their adaptation benefits. Establishing links to the broader regional programmes will ensure course material reflects international standards, while promoting South-South knowledge sharing. The course will be housed at a local learning institution, such as the UNTL Centre for Climate Change and Biodiversity.

Intra-ministerial coordination is also important to ensure effective coastal management. As aquaculture development is a priority to address food security in Timor-Leste, LDCF funds will support the development of intra-ministerial Standard Operating Procedures (SOPs) for MAF, to ensure that aquaculture development under the NDFA does not interfere with the mangrove protection/rehabilitation targets of National Directorate of Forestry (NDF) and the National Directorate of Protected Areas (NDPA).

Outcome 2: Mangrove-supportive livelihoods established to incentivize mangrove rehabilitation and protection

With LDCF intervention, mangrove coverage of Timor-Leste will increase through conservation and re-forestation efforts, protecting the shoreline from sea level rise; pressure from communities on mangroves will be reduced through the introduction of alternative livelihood support.

The aerial photos taken in 2014, for ongoing national spatial planning, will be analyzed and compared to historical records to update these figures. ALGIS and MAF will receive training in mangrove mapping/inventory, field surveys and coastal change analysis, to identify key areas of mangrove loss and vulnerability, and importantly, identify potential areas for mangrove restoration. A training-of-trainers programme will also be implemented for communities to contribute to ground truthing in selected project sites will verify this information. As light detection and ranging (LiDAR) data for the country becomes available, the project will assist in using this data to identify further areas of loss through coastal erosion and inundation.

LDCF funds will systematically strengthen the synergistic relationship between coastal communities and mangroves ecosystems and ensure that coastal communities in Timor-Leste have economic incentives to maintain and safeguard these protective natural systems, without compromising their livelihood options. This will be achieved through community-led adaptation interventions, which include mangrove re-forestation, conservation and livelihood diversification options (such as agroforestry, fish ponds, sustainable diversified localized agriculture) developed through integrated community-based, land use models, localized water security and harvesting, and adaptation plans.

Community plans will be strengthened through local, customary management tools, such as *tara bandu*⁵⁴ methods, linked to complementary, protected areas planning (where appropriate) and incorporated into suco (village) development plans. Given past failures with mangrove restoration via plantings and seedling nurseries, restoration efforts will adopt the ecological mangrove restoration (EMR) approach, which prioritizes natural regeneration and community governance informed by a detailed biophysical, socio-economic-political assessment.

Mangrove Protection and Afforestation

Many mangrove restoration attempts have failed worldwide due to a) poor understanding of the ecological and hydrological requirements of mangroves, particularly in establishment and early growth, and b) complex social-cultural, land tenure and ownership issues (Lewis, 2005, 2009). Direct seedling planting is also characterized by often, high mortalities (due to inappropriate siting and handling) and when successful, the establishment of unnatural, low diversity, mangrove systems or plantations.

The project will support community-based ecological mangrove restoration (CBEMR) – a local-scale, community-based approach to mangrove restoration that prioritizes natural regeneration and socio-cultural-political understanding, using participatory methods (Brown et al. 2014). Because of its emphasis on natural regeneration, EMR activities typically

⁵⁴ *Tara bandu* is traditional law or a social contract decided by local traditional knowledge and rules passed on orally within a region to regulate relations between people and the environment, and between people and groups. As it relates to mangroves, *tara bandu* can be a means of protecting mangrove sites from community pressures.
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result in high diversity, near-natural ecosystems. A rapid assessment uncovers the ecological, social and economic viability of mangrove generation at a proposed site. Principally, the rapid assessments help develop an understanding of the state of the mangrove system from an ecological and social perspective. In Indonesia, CBEMR has been particularly successful in re-forestation, disused shrimp ponds (or tambaks). Biophysically, this involved hand-digging of tidal creeks to encourage proper drainage of the site, and periodic propagule dispersal to encourage natural re-vegetation. In Timor-Leste, rice paddies have been established on the margins of many mangrove forests (particularly on the South coast) – and like shrimp ponds, are directly amenable to restoration of hydrological regimes. Where appropriate, natural fencing will be installed to deter grazing animals. Materials used will be strong enough to withstand tides and immersion in salt water.

An important message repeated during consultations, was the need to improve resilience of communities – the project must reach people. The project will employ community-based approaches to the extent possible. This includes mechanisms to provide funding directly to communities for CBEMR activities; this would not only empower communities but also prevent implementation delays related to administration. A number of mechanisms were explored during the PPG phase to deliver cash directly to communities. GIZ has, in the past, used a ‘cash box’. The box has 4 keys and a log to ensure agreement by various members of the communities on appropriate uses of the funds. Communities even established a lending system when surplus funds due to timing of activities, which generated interest and therefore extra funds for the project’s community-based activities. The GIZ project has recently concluded, use of this approach will be informed by the results of the final evaluation, once available. Another option that will be explored is the use of credit unions, with accounts held at the community-wide level for rapid disbursement of funds for activities.

To inform mangrove rehabilitation efforts, guidelines will be developed both for government technical officers as well as communities, detailing results of the rapid assessment from the specific site and the appropriate approach to ensure successful rehabilitation efforts. Guidelines will also ensure a consistent approach for mangrove rehabilitation going forward. Given the various parties engaged in supporting Timor-Leste, it is critical that efforts are consistent, in the sense that a national standard of excellence is maintained. Site selection for mangrove area rehabilitation will be informed by:

- Climate change risks and vulnerability
- Community-based, participatory, adaptive management approach
- Biophysical and socio-cultural site assessments - CBEMR provides a framework for both, biophysical and socio-cultural, assessment of potential restoration sites, to assess their suitability for EMR activities.
- Complementarity with offsets for the Tibar Bay Port and Tasi Mane construction projects, related to mangrove and wetland preservation
- Ramsar prioritization – wetlands of international importance under the Ramsar Convention
- Approval of MAF technical working group

A preliminary assessment of potential sites for mangrove rehabilitation was conducted during the PPG phase. The following sucos were identified based on national priority and vulnerability, as well as potential for community engagement: **Biacou** - Bobonaro district, **Lake Maubara, Ulmera** and **Tibar** - Liquiça district, **Hera** and **Metinaro** - Dili district, **Suai-Loro** and **Tafara** - Covalima district, **Lake Modo Mahut** - Manuhafi district, **Aubeon** - Manatuto district, **Irabin de Baixo** - Viqueque district, Further assessment of sites against the established criteria will be conducted during the project inception phase, for approval by the MAF technical working group.

These sites represent approximately 5,300 households and a population of 26,000. Livelihoods support under the LDCF project will directly target 1000 households or 5,000 people. Through mangrove rehabilitation, and by incorporating mangrove maintenance and mangrove-supportive livelihoods into suco development plans, the LDCF project will reach all 26,000 coastal residents. (Mangrove-supportive livelihoods and suco development plans are further described in the next section.) In project sites on the South coast, public awareness and monitoring by communities might be sufficient to ensure that mangroves areas are able to regenerate/thrive.

It is important to note that mangroves are an ideal habitat for crocodiles. By increasing mangrove coverage, there is also the likelihood of increasing the crocodile population. Crocodile attacks are a concern in Timor-Leste. Since 2007, GEF6 CEO Endorsement /Approval Template-Sept2015

Timor-Leste has had 53 reported attacks, 72% fatal⁵⁵. The Crocodile Task Force was established in 2012, and includes representatives from the Office of the President, MAF, MCIE, the Maritime Police of Timor-Leste and the Naval Force of the FFDTL. The LDCF project will consult with the task force to ensure that measures are taken to protect coastal communities (e.g. diamond mesh fencing to section off safe areas for swimming).

Introduction of Mangrove-Supportive Livelihoods

As a means of relieving community pressure on mangroves, the LDCF project will introduce alternative livelihood options which are in line with the vision and economic restructuring detailed in the SDP, particularly favoring women-lead social businesses. Specifically the plan seeks to move the economic base away from subsistence farming, and towards a more efficient agriculture sector, a growing private sector, and an expanding services sector. By modernizing and expanding the agriculture sector, and supporting rural economic development, the GoTL seeks to eradicate extreme poverty by 2030. The plan's related outcomes, which will inform project interventions include:

- Self-sufficiency in food with flourishing export trade in a range of agricultural products, including staples, livestock, fruit and vegetables and other cash crops, forestry products and fisheries products
- A growing number of light industries such as food processing, apparel manufacturing, handicrafts and cultural items, and furniture making
- A high number of sustainable small and micro businesses in growing industry sectors such as tourism, small scale manufacturing and high value cash crops

There are two critical elements to the mangrove-supportive livelihood strategy of the project a) addressing current malpractice (e.g. salt production, aquaculture) that is destructive to the mangroves and b) diversification by introducing other mangrove-friendly production practices (e.g. agroforestry, fuel wood production, fruit and vegetable gardens). A number of potential livelihood options were explored during the project design phase with a particular focus on a role for women, such as mangrove nurseries, mangrove-friendly aquaculture, food/fish processing, closed-loop sustainable agriculture, agroforestry, high value cash crops, and handicrafts (i.e. made from mangrove debris) with links to community-based ecotourism. Further information is available in Annex G.2. on initial feedback from communities.

Given the challenge of food security in Timor-Leste, the project will look primarily to support livelihoods which contribute to food production. Aquaculture development is a priority for the GoTL, however it can put pressure on the country's remaining mangrove areas. The SOPs and guidelines developed under Outcome 1 will help to ensure that site selection for aquaculture does not interfere with the NDF's and NDPA's mangrove protection efforts. Similarly, in project sites where aquaculture is a priority, LDCF support will ensure training to communities and collaboration with partners to ensure aquaculture is as mangrove-friendly as possible.

The Forest-Fish-Fruit model⁵⁷, for instance, has seen success in Bangladesh, and will be assessed for replication in Timor-Leste under the LDCF project. With support from the LDCF-funded *Community-based Adaptation to Climate Change through Coastal Afforestation in Bangladesh* project, communities plant protective, productive vegetation interspersed with fish nursery ponds. The project provides additional income and establishes a natural barrier of protection around some of Bangladesh's most vulnerable communities. An estimated 20,000 households have benefited from this model on more than 6,000 hectares of vulnerable coastal zones to manage and protect these resources that they rely on for their livelihoods in a changing climate⁵⁸. The model provides an innovative way to make barren coastal land productive again. By building mounds and ditches, fruit and timber trees can be grown, and fish can be cultivated. Interspersed with the fruit and timber trees are high yielding vegetables, which can also be grown on top of the mounds and along the banks of the ditches. The model can be created in areas that are protected by coastal mangrove forests, but that are outside of embankments. Because the entire model is raised, it is protected from tidal surges and storms.

⁵⁵ <http://theconversation.com/croc-attacks-a-new-website-with-bite-20671>

⁵⁶ These numbers are likely lower than the actual figures, as crocodile incidents in Timor-Leste go mostly unreported. This is due in part to the important cultural significance of crocodiles. Consultations on the South coast during the PPG phase found that communities had many stories of deaths resulting from encounters with crocodiles. The PPG team also noted a large visual presence of crocodiles during fieldwork consultations.

⁵⁷ http://www.bd.undp.org/content/dam/bangladesh/docs/Publications/A%20New%20Land%20Use%20Model_Forest%20Fruit%20Fish.pdf

⁵⁸ Case Study 7: Community-Based Adaptation to Climate Change through Coastal Afforestation in Bangladesh (J. Gordon, UNDP and F. Iqbal, GEF, 2015)

While successful, it should be noted that one of the challenges faced in Bangladesh in implementing the Forest-Fish-Fruit model was related to land use and community understanding of land rights. In Timor-Leste, the Constitution states fundamental rights to private property (Article 54), the right to housing (Article 58) and the right to the environment (Article 61). The National Spatial Planning and Law and Plan will further define land use in Timor-Leste. The proposed CBEMR approach to mangrove re-afforestation specifically undertakes pre-EMR socio-cultural assessments for target sites, to understand and address complex land tenure issues.

WorldFish also employs an ecosystems-based approach to aquaculture, specifically to address food insecurity. WorldFish's mission is to reduce poverty and hunger by improving fisheries and aquaculture, and it strives to achieve large scale, environmentally sustainable, increases in supply and access to fish at affordable prices for poor consumers in developing countries⁵⁹. A concern raised by WorldFish was the trend in Timor-Leste towards production of aquaculture for high value fish, such as grouper. Grouper have a market price of \$20-\$40/kg. While this may seem economically appealing, there are two challenges with this approach a) grouper feed on other fish (i.e. fish which could instead be consumed by communities) and b) such costs put grouper beyond the ability of the communities themselves to purchase. WorldFish instead focuses on fish such as milkfish and tilapia, which have a lower market value and does not require feed with fish meal. WorldFish is currently developing a recipe for plant-based, locally-sourced fish feed, expected to be completed in 2015. The LDCF project will collaborate closely with WorldFish, benefiting from their expertise and experience, to ensure quality support to livelihoods related to aquaculture and production of fish feed. The coastal vulnerability assessment data of Outcome 1 will help to inform WorldFish on siting for aquaculture – ensuring that further aquaculture development in Timor-Leste is mangrove-friendly and conducive to the goals coastal protection.

The ACIDI/VOCA infrastructure (hatchery) was established to support mudcrab farming, with the intention to develop a mudcrab industry for export to Singapore, as well as a parallel stream for local markets. Currently the hatchery lab is operational, but requires engagement of communities to raise these hatchlings locally, if it is to grow to potential scale. The LDCF project can foster these links with the communities at the selected sites to promote further mangrove supported livelihood development. Fieldwork consultations found that mudcrab projects established under the ACIDI/VOCA project were working effectively in those locations where access to market links had been put in place (e.g. Kamanek – a Dili based supermarket providing a regular delivery truck from local harvesting communities on the South coast – to be sold in the Dili market).

In addition to mangrove-friendly aquaculture, the LDCF project will support activities related to the mangroves themselves as livelihood alternatives. The CBEMR approach detailed above, for instance, provides various entry points for community engagement, such as coastal mapping, planting, and monitoring. Also, to support mangrove rehabilitation targets of the project, mangrove nurseries will need to be established. Guidance will be provided to communities on appropriate species selection and maturity of seedlings to ensure a good survival rate. The EU-GCCA programme has experience in nurseries as a viable livelihood, related to reforestation and sustainable land management (SLM) efforts. The EU-GCCA has applied an entrepreneurial approach, which will be considered for the LDCF project. The EU-GCCA programme works on reforestation, which includes livelihoods support to nurseries for this effort. The programme provides the technical expertise, and promises to purchase as many viable seedlings as produced. For instance, if the programme needed 50 trees, but 55 were produced which met quality standards, 55 would be purchased from the farmer. This incentive not only ensures a quality supply for reforestation efforts, but also creates opportunities for the farmer to ultimately sell quality outputs beyond the scope of the EU-GCCA programme. This entrepreneurial approach will be considered to mangrove nurseries supported by the LDCF project.

Given the promise of the tourism sector in Timor-Leste and the high priority given to ecotourism in the SDP, community-based ecotourism will also be explored as a complementary livelihood alternative in relevant project sites, where MTAC is already engaged. MTAC and the Tourism Association are supporting communities that have little access to market, through sensitization programmes on the demands of a growing tourism sector, and providing seed funding (i.e. for local investment and cooperative items such as boats). Similarly, the Marine Development Group has

⁵⁹ <http://www.worldfishcenter.org/who-we-are/mission>
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documented successes in engaging communities to support ecotourism in Atauro. The potential for ecotourism is very site specific, and due to risk, support would be provided at a small-scale in cooperation with MTAC or other partners. Another complementary livelihood which will be explored is the locally-sprung craft of collecting driftwood surface roots from mangrove trees for decorative painting. There is great potential to link these unique crafts to the tourism market, including for instance, messaging about the important role of mangroves in coastal ecosystems.

Livelihood support will be appropriate to the site, and be selected following extensive consultations with communities and MAF, and following robust economic analysis. Sucos selected for livelihoods support will correspond to priority areas for mangrove rehabilitation.

Outcome 3: Integrated approaches to coastal adaptation adopted to contribute to protection of coastal populations and productive lands

Improved watershed management upstream, reforestation and restoration of degraded lands, is needed to reduce excessive sediment loads to downstream coastal waterways, and areas that cause siltation of natural pond, mud-marsh and wetland systems, as well as in some places contributing to coastal accretion. Therefore, comprehensive plans for the restoration and protection of such natural systems within a broader landscape are essential for coastal resilience. Mangrove and wetland protection and restoration needs to be addressed from the national level through to community level and livelihood practices. Improved watershed management upstream, reforestation and restoration of degraded lands will reduce excessive sediment loads to downstream coastal waterways and areas that cause siltation of natural pond, mud marsh and wetland systems and in some places contribute to coastal accretion. Moreover, coastal natural ponds, wetlands and marches act as important storm and flood water storage facilities. They also buffer seawater intrusion into the aquifers.

Aquifers themselves protect against salt water intrusion provided that water tables are kept at appropriate levels. Therefore, plans for the restoration and protection of such natural systems within a broader landscape are essential for coastal resilience. LDCF resources will be used by MAF, MPW and MCIE to work together to outline coastal land use strategies and plans that are consistent with the restoration and protection of these natural systems that provide unique coastal protection services to the economic assets and coastal communities. In addition to groundwater salinity monitoring, LDCF resources will be used to design management and recharge scheme with accompanying monitoring procedures. Small scale micro-watershed and natural pond/wetland restoration measures with the engagement of local district / sub-district authorities and residing communities will be implemented. Liquiça and Metinaro provide a unique combination of mangrove and wetland systems that the project may focus for the on-the-ground actions under this outcome.

Through inclusion of project interventions into suco development plans (Outcome 2), LDCF resources will be used to ensure that public resources are secured for restoration and protection of coastal habitats that deliver essential services. The project will go further to identify other financial mechanisms will follow the principles of payment for ecosystem services (PES) and will be devised based on a thorough review of existing good practices worldwide that can be effectively customized to the country-specific context as well as contextual information from target areas in Timor-Leste.

An economic valuation conducted as part of PPG activities, estimated the total economic value of mangrove in Timor-Leste to be approximately US\$55.1million⁶⁰. Mangroves are used directly and indirectly by economic agents and the benefits are realized in various spatial contexts. The estimated value excludes other uses such as protective functions, regulation of sedimentation loads, breaking down and absorbing harmful materials and the non-use values. The direct and indirect use value constitutes an equal proportion to the economic value of the mangroves. The valuation is meant to provide an indication upon which to begin work related to PES.

The NBSAP sets a 2020 target to mobilize of financial resources for effectively implementing the SDP. Potential avenues identified include:

⁶⁰ Mangrove Economic Valuation and Payment for Economic Services Report (S. Masike, 2015)
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- Encourage and engage the major sources of fund support such as the government (oil and gas fund sources) and the private sector to invest in infrastructure services such as transportation and ecotourism activities
- Eco-tourism development/gate revenue
- Nature conservation tax
- Ecological service provider (water user tax)
- Catalyzing financing from private enterprise, developers and international donors

Project activities will build on the above, while also exploring other innovative financial mechanisms, especially with links to infrastructure development and the private sector. A PES rapid assessment conducted during the PPG phase of the project further indicated several areas which should be explored as potential revenue streams, specifically carbon credit markets⁶¹, tourism level and fishery levy (please see Annex G.3 of the UNDP project document).

4) incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, and co-financing

The project builds on a range of on-going baseline initiatives and leverages 4 times the grant contribution of \$7,000,000 in the form of co-financing totalling US\$31,644,402.

The plan for the GoTL's rehabilitation and reforestation goals is detailed in MAF's Midterm Operation Plan (MTOP). With a budget of US\$18,000,000 until 2018, the MTOP seeks to establish management regimes and strategies for degraded coastal areas, and protection and conservation of biodiversity in forest and coastal areas. The plan also promotes local communities as stewards of their natural environment.

In addition, there are several partners contributing to both, the above baseline, as well as the food security and sustainable livelihoods goals of the country – goals which are also reflected in the design of the LDCF project.

Development of the aquaculture sector is a priority for the GoTL to address food security. The LDCF project will therefore consider livelihood support of mangrove-friendly aquaculture for communities, where appropriate, in close collaboration with established partners. The Korea International Cooperation Agency (KOICA) will provide vocational training on aquaculture, including a training-of-trainers programme for communities, in Timor-Leste over the next 4 years. Assessment of sites for an aquaculture training facility is currently underway. KOICA's budget for aquaculture support in Timor-Leste is US\$6,000,000. WorldFish, an IGO, has worked with the government on the national aquaculture strategy and local coastal mapping. In addition to supporting aquaculture activities (e.g. pond input systems), WorldFish is also working with communities on identifying local ingredients for the production of fish food. The recipe is expected to be completed by end-2015, and will provide an additional, and related, livelihood option to communities – production of fish food is also a livelihood considered by the LDCF project. The ongoing budget for WorldFish in Timor-Leste is approximately US\$5,304,402 (i.e. NZD 5.1M, US\$1.5M, and AUD 600,000) over the next 4 years.

The European Union's (EU) *Global Climate Change Alliance (GCCA)* programme to Timor-Leste, through GIZ and Instituto Camões, seeks to strengthen the capacity of populations vulnerable to climate change risks to cope with climate change effects through the sustainable management of natural resources and the improvement of livelihood options. Activities include improving weather monitoring and analysis to inform planning, support to communities in assessing the best climate-adapted options at the local level and integrating solutions into existing planning processes. The programme will support communities in drafting local soil and water conservation plans. For this purpose, environmental profiles of the five major watersheds will be prepared, using participatory processes for assessing climate change effects on communities. The programme will also invest in awareness raising activities on climate change and its impacts, and promoting/providing training on forestry production (e.g. for enhancing the production capacity of national

⁶¹ It is estimated that the --average annual carbon sequestration rate for mangroves averages between 6 to 8 Mg CO₂e/ha (tons of CO₂ equivalent per hectare). These rates are about two to four times greater than global rates observed in mature tropical forests.

<http://thebluecarboninitiative.org/category/about/blue-carbon/>
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and community nurseries, improving planting success rates) and agroforestry (e.g. intercropping, forest gardening for non-timber forest products) as a response to land degradation. The programme is planned until 2018; the largest allocation related to the GIZ implemented portion has a total budget of approximately US\$2,340,000 (i.e. €2.2million).

Financial Summary of Co-financing

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Co-financing Amount (US\$)
Government	MAF	Grant/In Kind	18,000,000
Bilateral	KOICA	Grant	6,000,000
IGO	WorldFish	Grant	5,304,402
Bilateral	GIZ - EU GCCA	Grant	2,340,000
Total Co-financing			31,644,402

5) [global environmental benefits](#) (GEFTF) and/or [adaptation benefits](#) (LDCF/SCCF)

The project contributes to two objectives of the LDCF. Progress against outcomes will be measure by the corresponding indicators detailed below.

- LDCF Objective 1: *Reduce the vulnerability of people, livelihoods, physical assets and natural systems to the adverse effect of climate change.*
Outcome 1.1: Vulnerability of physical assets and natural systems reduced
 - Indicator 2: Type and extent of assets strengthened and/or better managed to withstand the effects of climate change
- Outcome 1.2: Livelihoods and sources of income of vulnerable populations diversified and strengthened
 - Indicator 3: Population benefiting from the adoption of diversified, climate-resilient livelihood options
- LDCF Objective 2: *Strengthen institutional and technical capacities for effective climate change adaptation*
Outcome 2.2: Access to improved climate information and early-warning systems enhanced at regional, national and local level
 - Indicator 7: Number of people/geographic area with access to improved climate information services
- LDCF Objective 3: *Integrate climate change adaptation into relevant policies, plan and associated process*
Outcome 3.2: Policies, plans and associated processes developed and strengthened to identify, prioritize and integrate adaptation strategies and measures
 - Indicator 12: Regional, national and sector-wide policies, plans and processes developed and strengthened to identify, prioritize and integrate adaptation strategies and measures.

6) innovativeness, sustainability and potential for scaling up

The LDCF project is aligned with national policies and priorities and considers the ambitions economic development goals of the country. During the PPG phase, an assessment of barriers was conducted and the project designed to specifically address those barriers – to ensure successful achievement of the project objective, as well as sustainability of project interventions.

Outcome 1 focuses on enabling policy for coastal adaptation, institutional capacity support, including coordination mechanisms, hardware for data collection, and training for informed and cohesive decision-making related to coastal zones. The coastal management and adaptation plan, the coastal protection and resilient strategy for infrastructure planning, and the MAF SOP, will put in place the necessary frameworks for inter-ministerial and intra-ministerial coordination going forward on planning decisions affecting coastal zones. Improved observation systems and economic analysis training will ensure that decision-making going forward is informed by the climate change risks and vulnerabilities, as well as the economic value of protective services the coastal ecosystems, such as mangrove stands, provide. To ensure that the training material is available beyond the duration of the project, it will be developed into a course for government staff/interested practitioners, to be housed at the UNTL Climate Change and Biodiversity Centre.

The LDCF project will also design a course targeted at younger university students (at the bachelor and/or master level) – stimulating interest on the topic for future policy makers.

Under Outcome 2, best practices will be applied to mangrove rehabilitation, coupled with SLM interventions to address erosion into coastal areas (Outcome 3), to ensure a high survival rate. By applying the CBEMR approach, communities will be engaged in planting, maintenance and monitoring of rehabilitation sites. This will include training on specific tasks, as well as sensitization regarding the important role of mangroves in coastal protection. Where community livelihood activities are putting pressure on mangrove areas, mangrove-supportive livelihood alternatives will be introduced. By sensitizing communities to these values and introducing livelihood alternatives, the risk of communities returning to practices which degrade mangrove forests will be mitigated to a considerable extent. Integration of mangrove forest maintenance costs into suco development plans will be a means of securing financing from the State budget, for continued maintenance.

Outcome 3 land-stabilization efforts through afforestation, agroforestry and bio-engineering methods will greatly contribute to integrity of coastal watersheds and improve a long term adaptive capacity of the natural systems and the population. This Outcome will also identify viable and sustainable funding options and mechanisms for landscape/watershed rehabilitation as to increase functional integrity of the broader coastal watersheds that include headwaters, waterways and all natural systems down towards the coastline. Further, this Outcome includes knowledge sharing/awareness raising activities targeted at various age groups, including promotion of best practices, integrating ecosystem services into school/university curriculum, and children's books/videos in Tetum, Portuguese and English on the nature-based approaches to climate change risk reduction. By raising public awareness, greater value can be placed on mangroves and destructive activities reduced.

Replicability was also key factor in the design of the project. While the groundworks will only be implemented in the priority coastal areas, the monitoring framework is designed to produce evidence of best practices, which can be considered for replication elsewhere. Given the high rate of failure of mangrove rehabilitation efforts, aerial photographs and ground truthing will be undertaken to ensure that mangrove areas are flourishing and that the used rehabilitation techniques are working. Similarly, an experimental design approach is being employed to produce evidence of increases in income as a result of the livelihoods interventions of the project. By comparing income at the start of the project, with income after the introduction of alternative livelihoods, the project can not only assess the success of livelihoods support but also provide assurance to communities based on evidence for further continuity, upscaling and replication, through inclusion in suco development plans.

Through the sharing of experiences, the project can also be replicated in other countries and regions, especially LDCs that face similar challenges as Timor-Leste with shoreline resilience. Lessons learned and best practices will be periodically documented through the regular monitoring, evaluation and reporting requirements of project implementation (further detailed in the Monitoring Framework and Evaluation section of this document). These will be disseminated according to UNDP policies, including publicly accessible online tools such as the UNDP Evaluation Resource Centre (<http://erc.undp.org>) and the UNDP Office of Audit & Investigation website (<http://www.undp.org/content/undp/en/home/operations/accountability/audit.html>). More frequent updates and communications materials will be shared via UNDP communication channels with national, regional, and global reach; these include UNDP websites, newsletters and press releases, the UNDP Adaptation Learning Mechanism.

A.2. Child Project? If this is a child project under a program, describe how the components contribute to the overall program impact.

N/A

A.3. Stakeholders. Elaborate on how the key stakeholders engagement, particularly with regard to [civil society organizations](#) and [indigenous peoples](#), is incorporated in the preparation and implementation of the project.

As the key partner in the project, MAF is involved in every aspect of the project. The below details additional stakeholders; inclusion of MAF is implied throughout.

Successful delivery of the products of Outcome 1 will entail extensive consultations and collaboration with various ministries. The coastal management and adaptation plan, each ministry engaged in activities affecting coastal zones will be consulted, namely: MCIE, MPSI, MPW, MSS, MTAC and MoJ. Similarly for the coastal protection and resilience strategy for infrastructure planning, MCIE, MPSI, and MPW will be engaged, as will the steering committee/technical working groups for the Tibar Bay Port and Tasi Mane projects. JICA has been providing support to MPW on land use and will also be consulted. To develop and deliver training, input will be sought from IUCN, UNDP (ECCA), and UNTL. The MAF SOP will require engagement with various directorates under MAF, including NDF, NDPA and NDFA.

The steering committees/technical working groups for the Tibar Bay Port and Tasi Mane projects are also stakeholders for Outcome 2 due to the related offsets, as is MPW. For the livelihoods support under Outcome 2, organizations, such as WorldFish and KOICA, are important stakeholders given their ongoing work to support aquaculture in Timor-Leste. In addition, various NGOs are engaged in small-scale livelihoods support in communities and will be consulted and may be formally engaged during project implementation.

GIZ, Instituto Camões and JICA are engaged in SLM and watershed management activities in Timor-Leste, and will be consulted regarding related interventions of Outcome 3. As the project seeks to identify potential revenue streams, MTAC is therefore a critical stakeholder given the potential for tourism in the country, as is the related private sector.

The engagement of communities has been woven throughout the project design, particularly through the CBEMR approach to mangrove rehabilitation, as well as livelihoods support (Outcome 2).

A.4. Gender Equality and Women's Empowerment. Elaborate on how gender equality and women's empowerment issues are mainstreamed into the project implementation and monitoring, taking into account the differences, needs, roles and priorities of women and men.

The 2014 Human Development Index (HDI) value for Timor-Leste was 0.620, ranking the country at 128 (of 187) on the global list. Peace has provided the needed space for development and growth, resulting in a significant HDI value increase, from 0.465 in 2000. However, 49.9% of the population is still below the poverty line, with women especially affected due to limited opportunities for decision-making and less access to economic opportunities. This is reflected in the stark difference in the purchasing power parity (PPP) between men and women. Per the 2014 HDR, the 2011 estimate gross national income per capita PPP for men was US\$13,582 and only US\$5,634 for women.

As part of PPG activities, a desk review of available research and stakeholder consultations were conducted to identify main areas of concern for women in Timor-Leste (see Annex G.2. of the UNDP Project Document). These include⁶²:

- Low levels of education and literacy – 37% of women have never been to school, 30% have some primary education, 26% have some secondary education, and 2% have more than secondary education
- Dual workload burden – women are responsible for reproductive work and household duties, but equally responsible for productive work and sale of produce (e.g. from farming)
- High fertility rates and high number of dependent children – 5.7 births per woman
- High maternal and child mortality, and malnutrition particularly of children
- Lack of inheritance and land ownership rights; resulting in
 - Financial dependence on husbands
 - Inability to accumulate financial resources and proceed with potential business ideas
 - Inability to escape domestic abuse and violence⁶³

⁶² Gender Report for Building Shoreline Resilience of Timor-Leste to Protect Local Communities and Their Livelihoods (S. Larson, 2015)

⁶³ Nationally, more than 38% of women have experienced physical violence, with 28% having experienced violence in the past 12 months. Of women having experienced violence, the husband was the person responsible for 74% of cases. Justification of wife beating is captured in the HDR, and Timor-Leste is among the highest in the world in terms of acceptance, with 86.2% of women and 80.7% of men believing that wife beating is justified in certain circumstances.

- Low decision making rights in relation to major decisions and assets, within households and within the community;
- Little-to-no acknowledgment of women as drivers of transformational change in the community and in society
- Cultural practices – e.g. *Barlake*, a negotiated contractual agreement between families (monetary or otherwise) for wives, which ultimately determines broader family relationship patterns – including property rights, children's obligations to the family, and the role of women in the household

Approximately 63% of households are engaged in agriculture livelihoods, and 40% live in coastal areas. As climate change continues to impact crop yield and related water availability, women will be especially affected due to their weaker economic and social position. These above findings indicate the need for tailored support which responds to the particular needs of women, in order to strengthen overall capacity to respond to climate change.

Output 2.2 introduces mangrove-supportive livelihoods to reduce community pressure on mangroves, and will focus 30% of support on livelihoods which empower women. Ensuring thorough consultations with communities, and effective livelihoods support, will require sensitivity to the particular challenges faced by women. For instance, a 2009 baseline study found that domestic violence was a 'normal' occurrence for many women. A gender specialist will be recruited by the project to ensure that consultations a) capture the views of women b) are gathered from women in a manner that does not put them at risk, and c) that selected livelihood interventions are implemented in a gender-sensitive manner and prioritize benefit to, and empowerment of, women.

To monitor progress, gender-disaggregated data will be collected and analyzed to assess the percentage change in household income in select communities (please see Annex A: Project Results Framework).

A.5 Risk. Elaborate on indicated risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, the proposed measures that address these risks at the time of project implementation.(table format acceptable):

Risks and mitigation measures were identified during the inception workshop, as well as through consultations with government, development partners and communities, during the project development phase. Key risks and planned mitigation measures for project implementation include the following:

Risks	Probability and Impact ⁶⁴	Mitigation Measures
Coordination among the various directorates at the concerned ministries will remain limited and preclude an agreement over a consensus-based, multi-sectoral and integrated coastal management and adaptation plan.	P:3 I:4	The stakeholder involvement plan will ensure consultations with the inter-ministerial steering committee for Land Use Planning, as well as other relevant technical working groups. This will not only ensure the input and consensus is sought from various sectors, but also, will give the project and its objective a high level of visibility in planning processes.
Ineffective coordination among the various MAF directorates, result in policies and plans which inadvertently impact the mangrove rehabilitation targets.	P:2 I:4	A technical working group will be established and an SOP developed for directorates under MAF, detailing roles, responsibilities and a monitoring framework.
Coastal flood risk not adequately considered in coastal adaptation plan because tidal gauge information not captured and applied. Mangrove protection and re-afforestation efforts result in low survival rates because tidal	P:1 I:4	Tidal gauges will be installed, monitored and maintained with project resources during the project duration. Information collected during this time will inform all LDCF project activities. Training will be provided to government staff and to communities to monitor, record and report data.

⁶⁴ Impact and Probability Scale, 1-5 (from very low to very high)
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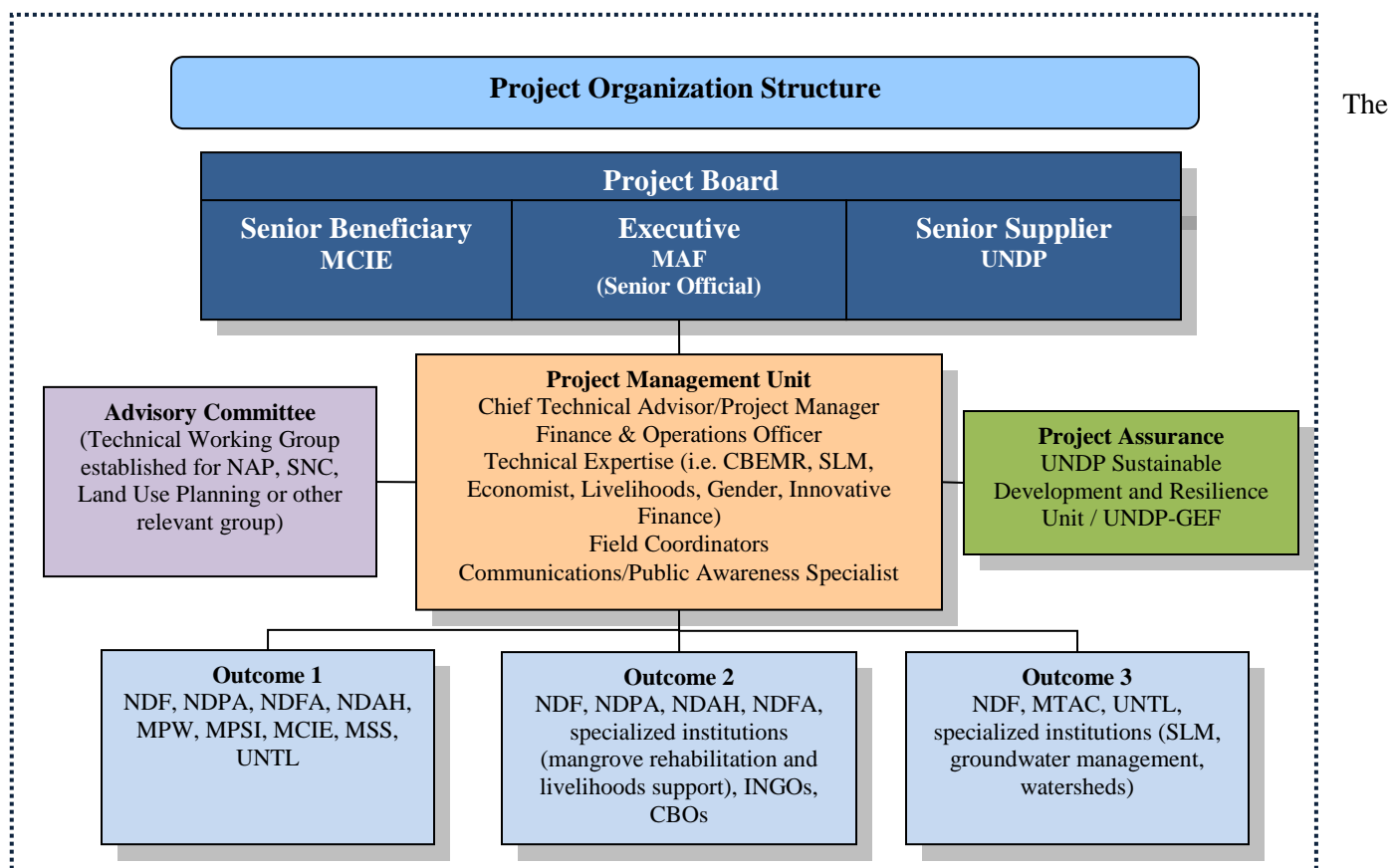
Risks	Probability and Impact ⁶⁴	Mitigation Measures
data is not appropriately considered.		
Mangrove protection and re-forestation efforts result in low survival rates.	P:2 I:4	The LDCF project will employ international best EMR best practices, with community engagement to reduce related pressures on mangrove forests.
Communities are reluctant to adopt new land use practices and mangrove-supportive livelihood options due to, perceived risks to their income stability, and uncertainties over the market demand, and continue with activities which degrade mangrove areas.	P:3 I:4	Community consultations, robust economic analysis will precede introduction of alternative livelihood options. Training will be provided to communities to making the link between protection of ecosystems and economic/social value.
Rehabilitated mangrove areas are eventually degraded after the project close.	P:3 I:4	Guidelines on mangrove rehabilitation will be developed to inform appropriate species selection and technique. Innovative financial mechanism for long term maintenance of mangrove forests. This will be accompanied by financial analysis skill for government staff for cost efficient planning and securing of financial resources.
Protection and re-forestation efforts result in increases in the crocodile population.	P:2 I:2	The project will seek advice and guidance from the Crocodile Task Force to ensure measures are taken to protect coastal communities.
Failure to identify viable revenue streams or secure financing for long term maintenance or mangrove areas	P:3 I:2	The project will build on the work already conducted for the NBSAP, as well as the LDCF PPG stage, to identify potential revenue streams. An expert will be hired to further explore these options. Training on economic analysis will ensure that MAF is able to present the needs and proposed measures for mangrove activities, for public or other sources of funds, in a manner that proves economic value and cost-effectiveness.
Communication materials are not tailored to audiences or delivered in a manner which ensures broad outreach.	P:2 I:3	Communications will target groups with potential for greatest impact, especially coastal communities and youth, with specific consideration for the distribution possibilities which will maximize absorption and reach (i.e. books, events, print material, radio, TV in a language appropriate for the target audience, etc.)

A.6. Institutional Arrangement and Coordination. Describe the institutional arrangement for project implementation. Elaborate on the planned coordination with other relevant GEF-financed projects and other initiatives.

Institutional Arrangements for Project Implementation

Per agreements between UNDP and the GoTL, Direct Implementation (DIM) will be used for all UNDP programmes in the country. As part of UNDP's institutional capacity development strategy for Timor-Leste, UNDP will, to the extent possible, be employing a National Implementation Modality (NIM) type approach under the overarching DIM management arrangements. This approach will utilize NIM advances, based on capacity assessments MAF, and assurance measures will be undertaken to mitigate capacity gaps. Letters of Agreement will be signed with the relevant government entities, as necessary, to act as "Responsible Parties" under UNDP rules and regulations.

The project operational structure is detailed below.



Project Board is responsible for making management decisions for a project in particular when guidance is required by the Project Manager. The Project Board plays a critical role in project monitoring and evaluations by quality assuring these processes and products, and using evaluations for performance improvement, accountability and learning. It ensures that required resources are committed and arbitrates on any conflicts within the project or negotiates a solution to any problems with external bodies. In addition, it approves the appointment and responsibilities of the Project Manager and any delegation of its Project Assurance responsibilities. Based on the approved Annual Work Plan, the Project Board can also consider and approve the quarterly plans (if applicable) and also approve any essential deviations from the original plans.

In order to ensure UNDP's ultimate accountability for the project results, Project Board decisions will be made in accordance to standards that shall ensure management for development results, best value money, fairness, integrity, transparency and effective international competition. In case consensus cannot be reached within the Board, the final decision shall rest with the UNDP Project Manager.

Potential members of the Project Board are reviewed and recommended for approval during the PAC meeting. Representatives of other stakeholders can be included in the Board as appropriate. The Board contains three distinct roles, including:

- 1) **Executive:** individual representing the project ownership to chair the group.
- 2) **Senior Supplier:** individual or group representing the interests of the parties concerned which provide funding for specific cost sharing projects and/or technical expertise to the project. The Senior Supplier's primary function within the Board is to provide guidance regarding the technical feasibility of the project.
- 3) **Senior Beneficiary:** individual or group of individuals representing the interests of those who will ultimately benefit from the project. The Senior Beneficiary's primary function within the Board is to ensure the realization of project results from the perspective of project beneficiaries.

- 4) The **Project Assurance** role supports the Project Board Executive by carrying out objective and independent project oversight and monitoring functions. The Project Manager and Project Assurance roles should never be held by the same individual for the same project.

Project Manager: The Project Manager has the authority to run the project on a day-to-day basis on behalf of the Implementing Partner within the constraints laid down by the Board. The Project Manager's prime responsibility is to ensure that the project produces the results specified in the project document, to the required standard of quality and within the specified constraints of time and cost.

Project Support: The Project Support role provides project administration, management and technical support to the Project Manager as required by the needs of the individual project or Project Manager.

Coordination with Other Relevant GEF-financed Projects and Other Initiatives

The LDCF project will be complemented by the efforts of other LDCF projects.

The GEF-funded *Promoting Sustainable Bio-energy Production from Biomass (SBEPB)* project is a four-year project contributing to the reduction of greenhouse gas (GHG) emissions through removal of barriers to sustainable production and utilization of biomass resources in Timor-Leste, and application of biomass energy technologies to support local economic, environmental and social development. The objective of the project is to promote investment in renewable energy technologies by a) enhancing the capacity of all relevant public and private stakeholders, b) developing policy and legal bioenergy frameworks for the promotion of energy efficient and low carbon end-use appliances and c) scaling up of 20,000 improved cook stoves in the country. The project will assist the GoTL in mainstreaming sustainable biomass energy in policy formulation and consequently help in mitigating the national emission of greenhouse gases resulting from deforestation and the use of non-renewable biomass. The project will help to increase Timor-Leste's access to clean bioenergy, as well as create employment through inclusive businesses and support community-managed forestry. Opportunities for complementarity exist with this project, which will reduce community pressures on mangroves for fuel wood. Site selection for mangrove rehabilitation under LDCF project will consider intervention sites for the SBEPB project to maximize the impact of combined resources.

The LDCF-funded *Strengthening Community Resilience to Climate-induced disasters in the Dili-to-Ainaro Road Development Corridor, Timor-Leste* project seeks to strengthen critical economic infrastructure for sustained human development protected from climate-induced natural hazards (flooding, landslides, wind damage) through better policies, strengthened local disaster risk management (DRM) institutions and investments in risk reduction measures. Vulnerability assessments will be conducted and watershed management plans developed, which may include elements for implementation such as a) ecosystem farming that is diverse, multi-storey and mid-successional to promote climate resilience and productivity; b) permaculture/conservation farming/agro-forestry methods applicable to local conditions that increase resilience to climate impacts such as water scarcity; c) planting trees that will reduce the risk of erosion while also providing shade for coffee plantations; and d) home garden and hillside farming techniques. Given the relevance to Outcome 3 of this project, there are opportunities for complementarity, sharing of lessons learned and best practices, as well as joint activities on public awareness with communities on integrated ecosystems.

And a PIF, for LDCF funding consideration, has been developed and submitted for donor approval. The proposed *Developing capacities for iterative National Adaptation Planning (NAP) process for climate resilient development* project will build capacity in adaptation planning, budgeting, implementation and monitoring, and improve individual and institutional capacities to deliver climate services for adaptation planning across priority sectors. Importantly, the project will support the development of a NAP to establish the institutional, policy and fiscal framework for climate change adaptation planning.

A.7 Benefits. Describe the socioeconomic benefits to be delivered by the project at the national and local levels. How do these benefits translate in supporting the achievement of global environment benefits (GEF Trust Fund) or adaptation benefits (LDCF/SCCF)?

The LDCF project will support mangrove rehabilitation using the CBEMR approach – a local-scale, community-based approach to mangrove restoration that prioritizes natural regeneration and socio-cultural-political understanding, using participatory methods. Interventions will target 1,000ha, supporting LDCF Outcome 1.1 Vulnerability of physical assets and natural systems reduced. Given the steep terrain of Timor-Leste, Outcome 3 of the project includes sustainable land management practices including small-scale reforestation, also contributing to LDCF Outcome 1.1.

A significant portion of the project budget is dedicated to introducing mangrove-supportive livelihoods in project sites, to reduce community pressure on mangroves; these include mangrove nurseries to support rehabilitation efforts. Given the challenge of food security in Timor-Leste, livelihood options also include those which contribute to food production (e.g. mangrove-friendly aquaculture, fish processing, fish food production, home gardens, etc.). Livelihoods interventions will target 1,000 households, with 30% of interventions being focused on women. Assessment through randomized control trials will ensure that livelihoods support is resulting in a positive increase in household incomes of project beneficiaries.

The following sucos were identified during the PPG phase, based on national priority and vulnerability, as well as potential for community engagement: **Biacou** - Bobonaro district, **Lake Maubara**, **Ulmera** and **Tibar** - Liquiça district, **Hera** and **Metinaro** - Dili district, **Suai-Loro** and **Tafara** - Covalima district, **Lake Modo Mahut** - Manuhafi district, **Aubeon** - Manatuto district, **Irabin de Baixo** - Viqueque district. Further assessment of sites against the established criteria will be conducted during the project inception phase, for approval by the MAF technical working group. In these locations, the population is approximately 26,000, made up of 5,300 households⁶⁵. By integrating public awareness on coastal ecosystems, CBEMR, and evidence-based livelihoods into suco development plans and budgets, the LDCF project interventions can be upscaled and replicated reaching all 26,000 people.

At the national/sectoral levels, the LDCF project will support the government to balance development priorities and climate-resilient planning. The comprehensive coastal management and adaptation plan, as well as a coastal protection and resilience strategy for infrastructure planning, will ultimately contribute to the protection of the entire Timor-Leste coastline and coastal communities. Similarly, SOPs for MAF will ensure that priority initiatives such as aquaculture does not inadvertently weaken the country's natural protection (i.e. mangrove forests) to the rising sea.

A.8 Knowledge Management. Elaborate on the knowledge management approach for the project, including, if any, plans for the project to learn from other relevant projects and initiatives (e.g. participate in trainings, conferences, stakeholder exchanges, virtual networks, project twinning) and plans for the project to assess and document in a user-friendly form (e.g. lessons learned briefs, engaging websites, guidebooks based on experience) and share these experiences and expertise (e.g. participate in community of practices, organize seminars, trainings and conferences) with relevant stakeholders.

Consultations with MAF indicate that Timor-Leste has an oral culture, and there is a desire and need to start documenting technical knowledge. To that end, various tools and methods have been included in the project design. Guidelines for mangroves rehabilitation have been included so that the best practices of the LDCF project can be further replicated. Similarly, the randomized control trials related to livelihoods output will provide evidence for consideration in further replication and upscaling. Inter-ministerial workshops provide opportunities for coordination as well as for knowledge sharing; with outcomes of the workshops informing planning.

Close collaboration with partners (e.g. WorldFish, KOICA, GIZ) will ensure that the project benefits from the lessons learned and best practices of related efforts.

Further, following standard UNDP practice, lessons learned and best practices will be periodically documented through the regular monitoring, evaluation and reporting requirements of project implementation (further detailed in the Monitoring Framework and Evaluation section of this document). These will be disseminated according to UNDP

⁶⁵ Timor-Leste Population and Housing Census 2010, Analytical Report on Youth Vol. 16 (NSD, UNFPA, UNICEF, 2012)

policies, including publicly accessible online tools such as the UNDP Evaluation Resource Centre (<http://erc.undp.org>) and the UNDP Office of Audit & Investigation website (<http://www.undp.org/content/undp/en/home/operations/accountability/audit.html>). More frequent updates and communications materials will be shared via UNDP communication channels with national, regional, and global reach; these include UNDP websites, newsletters and press releases, the UNDP Adaptation Learning Mechanism.

B. DESCRIPTION OF THE CONSISTENCY OF THE PROJECT WITH:

B.1 Consistency with National Priorities. Describe the consistency of the project with national strategies and plans or reports and assessments under relevant conventions such as NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, etc.:

The LDCF project is consistent with national strategies and plans. The **Timor-Leste Strategic Development Plan (SDP) 2011-2030** was a guiding document in the design of the project. The SDP lays out a 20 year plan aimed to transition Timor-Leste from an LDC to an upper middle income country. As challenges to meet that goal, the plan details the GoTL's concerns regarding the impacts of climate change on agricultural production, food security and its promising tourism industry, as well as the increased risk of flooding, drought and landslides. The plan acknowledges 3 critical areas as being especially susceptible to changes in climate and sea level rise, which need protection: water resources, soil and the coastal zone. The resulting **VI Constitutional Government Plan 2015-2017** commits to continuing to develop policies for river basin management and coastal zones, including strategies to rehabilitate and protect mangroves. The plan also seeks to improve land management and strengthen conservation efforts, towards more sustainable economic development for Timor-Leste, through the introduction of appropriate legislation, rehabilitation efforts, and programmes designed to reduce deforestation (e.g. identifying alternative energy sources to reduce deforestation for fuelwood).

The GoTL outlined its key adaptation priorities in its NAPA, finalized in 2010. The country has already benefited from the LDCF funding to address climate resilience of the rural infrastructure and improve its climate related disaster risk management. This LDCF project will further contribute directly and indirectly to several priorities of the NAPA, specifically 1, 2, 4, 5 and National Institutional Capacity for Climate Change (see Table 3: NAPA Adaptation Priorities).

Outcome 2 focuses on mangrove regeneration to protect the shoreline from sea level rise, storm surges and coastal erosion. Outcome 2 also supports alternative livelihoods to relieve community pressures on mangroves areas (e.g. to prevent felling for firewood to cook salt). Given the food security challenges of Timor-Leste, particular focus will be on livelihoods that contribute to food production (e.g. mangrove-friendly aquaculture). Outcome 3 looks at the broader landscape to protect coastal areas and coastal communities from upland pressures; this includes small scale reforestation and monitoring of the groundwater. Outcome 1 focuses on the institutional capacity and policy frameworks to support coastal adaptation, as well as disaster risk reduction in the context of the coastal setting. The project is described in greater detail in section 2.4. Project Objective, Outcomes and Outputs/Activities.

Rank	NAPA Priorities
1	Food Security: Reduce vulnerability of farmers and pastoralists to increased drought and flood events by improving their capacity to plan for and respond to future climatic conditions and improve national food production.
2	Water Resources: Promote integrated water resource management (IWRM) to guarantee water access for food production, sanitary uses, ecosystems and industry development.
3	Human Health: Enhance capacity of the health sector to anticipate and respond to changes in distribution of endemic and epidemic climate-sensitive diseases, and reduce vulnerability of the population to infection in areas at risk from expansion of climate-related diseases.
4	Natural Disasters: Improve institutional and staff capacity in the disaster sector in relation to climate change induced disasters.

Rank	NAPA Priorities
5	Forests, Biodiversity and Coastal Ecosystems Resilience <ul style="list-style-type: none"> • Maintain mangrove plantations and promote awareness-raising to protect coastal ecosystems from impacts of sea level rise. • Include ecosystem management in national planning to develop sustainable, ongoing programme, nurseries and community awareness development.
6	Livestock Production: Improve planning and legal framework for promoting sustainable and balanced food for livestock production under increased climate variability and climate change conditions.
7	Physical Infrastructure: Improve regulations and standards for climate-resilient infrastructure.
8	Oil and Gas Production: Strengthen and protect valuable offshore oil and gas infrastructure against climate change impacts.
Not ranked, integrated into all of the above	National Institutional Capacity for Climate Change: Strengthen capacity and improve coordination, through which overarching programme level coherence will be ensured.

Further, Priority Strategy 2 of the **National Biodiversity Strategy and Action Plan of Timor-Leste (NBSAP) 2011-2020** seeks to protect biodiversity and promote sustainable use, which focuses on a) rehabilitation activities in critical watersheds and degraded lands, and b) sustainable livelihoods to local communities through ecosystem restoration activities. Listed activities include:

- Enhance and develop national biodiversity laws and relevant environmental policies on nature conservation, pollution and other related concerns, including traditional laws
- Intensively rehabilitate critical and damaged habitats and ecosystems and degraded watersheds through massive tree planting, including mangroves reforestation
- Implement sustainable livelihood activities for local communities and promote sustainable use of natural resources, including promoting traditional conservation knowledge and practices, and enhancing the role of women and youth

Section 5 of **Regulation No. 2000/19 on Protected Areas** specifies the protection of wetlands and mangroves. Articles 22 and 23 of the **Biodiversity Decree Law** protect natural existing wetlands and mangrove areas from pollution, draining, or destruction.

Action Programme 6 of the **National Action Plan to Combat Land Degradation** focuses on the rehabilitation of degraded lands and protection of water resources. The plan states that the achievement of the national development goal of eradicating poverty is directly related to resolution of the land degradation problem, specifically because degraded lands will be not able to perform their productive function to maintain the provision of the resources in order to support basic human needs. The plan states that immediate action is required for the rehabilitation of degraded lands and protection of water resources.

C. DESCRIBE THE BUDGETED M & E PLAN:

The project will be monitored through the following M&E activities. The M&E budget is provided in the table below.


Type of M&E Activity	Responsible Parties	Budget US\$ <i>Excluding project team staff time</i>	Time Frame
Inception Workshop and Report	<ul style="list-style-type: none"> Project Manager UNDP CO, UNDP CCA 	Indicative cost: \$10,000	Within first two months of project start up
Measurement of Means of Verification of project results.	<ul style="list-style-type: none"> UNDP CCA RTA/Project Manager will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members. 	To be finalized in Inception Phase and Workshop.	Start, mid and end of project (during evaluation cycle) and annually when required.
Measurement of Means of Verification for Project Progress on <i>output and implementation</i>	<ul style="list-style-type: none"> Oversight by Project Manager Project team 	To be determined as part of the Annual Work Plan's preparation.	Annually prior to ARR/PIR and to the definition of annual work plans
ARR/PIR	<ul style="list-style-type: none"> Project manager and team UNDP CO UNDP RTA UNDP EEG 	None	Annually
Periodic status/ progress reports	<ul style="list-style-type: none"> Project manager and team 	None	Quarterly
Randomized Control Trials (RCTs) ⁶⁶	<ul style="list-style-type: none"> Oversight by Project manager in consultation with MAF 	To be determined as part of the Annual Work Plan's preparation Indicative cost: \$20,000/survey (total \$60,000)	At start, midterm and end of project
Mid-term Evaluation	<ul style="list-style-type: none"> Project manager and team UNDP CO UNDP RCU External Consultants (i.e. evaluation team) 	Indicative cost: \$40,000	At the mid-point of project implementation.
Final Evaluation	<ul style="list-style-type: none"> Project manager and team, UNDP CO UNDP RCU External Consultants (i.e. evaluation team) 	Indicative cost : \$45,000	At least three months before the end of project implementation
Project Terminal Report	<ul style="list-style-type: none"> Project manager and team UNDP CO local consultant 	None	At least three months before the end of the project
Audit	<ul style="list-style-type: none"> UNDP CO Project manager and team 	Indicative cost per year: \$15,000 (\$60,000 total)	Following DIM guidelines and procedures (budgeted annually)
Visits to field sites	<ul style="list-style-type: none"> UNDP CO UNDP RCU (as appropriate) Government representatives 	For GEF supported projects, paid from IA fees and operational budget	Yearly
Total Indicative Cost Excluding project team staff time and UNDP staff and travel expenses		US\$ 215,000 (upto 5% of total budget)	

⁶⁶ Please see Annex F for more details
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PART III: CERTIFICATION BY GEF PARTNER AGENCY(IES)

A. GEF Agency(ies) certification

This request has been prepared in accordance with GEF policies⁶⁷ and procedures and meets the GEF criteria for CEO endorsement under GEF-6.

Agency Coordinator, Agency Name	Signature	Date (MM/dd/yyyy)	Project Contact Person	Telephone	Email Address
Adriana Dinu, Executive Coordinator, UNDP-GEF		03/21/2016	Keti Chachibaia, Regional Technical Advisor, UNDP	+66 (2) 304 9100 ext 5091	keti.chachibaia@undp.org

⁶⁷ GEF policies encompass all managed trust funds, namely: GEFTF, LDCF, and SCCF
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ANNEX A: PROJECT RESULTS FRAMEWORK (either copy and paste here the framework from the Agency document, or provide reference to the page in the project document where the framework could be found).

<p>This project will contribute to achieving the following Country Programme Outcome as defined in CPAP/CPD or UNDAF:</p> <p>UNDAF Outcome 1: People of Timor-Leste, especially the most disadvantaged groups, benefit from inclusive and responsive quality health, education and other social services, and are more resilient to disasters and the impacts of climate change. <u>Sub-Outcome 1.4.</u> People of Timor-Leste, particularly those living in rural areas vulnerable to disasters and the impacts of climate change, are more resilient and benefit from improved risk and sustainable environment management</p> <p>UNDAF Outcome 3: Economic policies and programmes geared towards inclusive, sustainable and equitable growth and decent jobs <u>Sub-Outcome 3.2.</u> Technical capacity enhanced to develop viable and sustainable agribusiness sub-sectors and value chains promoting local bio-diversity</p>					
<p>Country Programme and/or UNDAF Outcome Indicators: UNDAF 1.4.1. Number of evidence-based climate change risk/vulnerability assessment reports and policy recommendation documents, timely disseminated UNDAF 3.2.3. Ha of degraded mangrove areas rehabilitated</p>					
<p>Primary applicable UNDP Strategic Plan Outcomes: Outcome 1: Growth and development are inclusive and sustainable, incorporating productive capacities that create employment and livelihoods for the poor and excluded</p>					
<p>Applicable SOF (LDCF) Strategic Objective and Program: Objective 1: Reduce the vulnerability of people, livelihoods, physical assets and natural systems to the adverse effects of climate change Objective 2: Strengthen institutional and technical capacities for effective climate change adaptation Objective 3: Integrate climate change adaptation into relevant policies, plans and associated processes</p>					
<p>Applicable LDCF Expected Outcomes: Outcome 1.1: Vulnerability of physical assets and natural systems reduced Outcome 1.2: Livelihood and sources of income of vulnerable populations diversified and strengthened Outcome 2.2: Access to improved climate information and early-warning systems enhanced at regional, national, sub-national and local levels Outcome 3.2: Policies, plans and associated processes developed and strengthened to identify, prioritize and integrate adaptation strategies and measures</p>					
<p>Applicable LDCF Outcome Indicators: Indicator 2: Type and extent of assets strengthened and/or better managed to withstand the effects of climate change Indicator 3: Population benefiting from the adoption of diversified, climate-resilient livelihood options Indicator 7: Number of people/ geographical area with access to improved climate information services Indicator 12: Regional, national and sector-wide policies, plans and processes developed and strengthened to identify, prioritize and integrate adaptation strategies and measures</p>					
	Indicator	Baseline	Targets End of Project	Source of Verification	Risks
Project Objective⁶⁸ To strengthen resilience of coastal communities by the introduction of	Regional, national and sector-wide policies, plans and processes developed and strengthened to	This is currently no coastal protection and resilience strategy for infrastructure planning in place.	Coastal protection and resilience strategy for infrastructure planning endorsed benefitting coastal	Inter-ministerial meeting minutes	Coordination among the various directorates at the concerned ministries will remain limited and preclude an agreement over a consensus-based, multi-sectoral and

⁶⁸ Objective (Atlas output) monitored quarterly ERBM and annually in APR/PIR
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nature-based approaches to coastal protection	identify, prioritize and integrate adaptation strategies and measures. (LDCF Indicator 12)		communities (40% of the total population or 400,000 people)		integrated coastal management and adaptation plan.
Outcome 1⁶⁹ Policy framework and institutional capacity for climate resilient coastal management established	SOP for directorates under MAF, developed and approved	Efforts across MAF directorates are not effectively coordinated to ensure the protection and rehabilitation of mangrove areas.	SOP for coordinated approach to protect mangrove areas designed and successfully tested	MAF TWG established MAF TWG meeting minutes Project Reports Independent Evaluations	Ineffective coordination among the various MAF directorates, result in policies and plans which inadvertently impact the mangrove rehabilitation targets.
	Number of people/ geographical area with access to improved climate information services (LDCF Indicator 7)	0 – tidal information not regularly collected to inform coastal planning, including mangrove re-afforestation efforts	26,000 people, total population at indicative project sites (per 2010 Census)	Regular collection and recording of data Maintenance of equipment Application of data in risk maps for planning purposes	Coastal flood risk not adequately considered in coastal adaptation plan because tidal gauge information not adequately captured and applied. Mangrove protection and re-afforestation efforts result in low survival rates because tidal data is not appropriately considered.
Outcome 2 Mangrove-supportive livelihoods established to incentivize mangrove rehabilitation and protection	Type and extent of assets strengthened and/or better managed to withstand the effects of climate change (UNDAF Indicator 3.2.3, LDCF Indicator 2)	~1,300ha or 13km ² in Timor-Leste (2005) - these figures will be updated once the 2014 high resolution aerial photographs are analyzed, followed by ground truthing, to calculate more current mangrove coverage, especially in sites selected for project intervention	2,300ha or 23km ² protected or re-afforested using CBEMR	Ground truthing at the midterm and end of the project to assess actual mangrove coverage. Regular project site visits by project manager and experts.	Mangrove protection and re-afforestation efforts result in low survival rates. Rehabilitated mangrove areas are eventually degraded after the project close. Protection and re-afforestation efforts result in increases in the crocodile population.

⁶⁹ All outcomes monitored annually in the APR/PIR. It is highly recommended not to have more than 4 outcomes.
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	Number of population / households benefiting from the adoption of diversified, climate-resilient livelihood options (LDCF Indicator 3)	0 – project will introduce livelihood options, which contribute to protection and re-afforestation efforts and/or relieve community pressure on mangroves	1,000 households benefiting from mangrove-supportive livelihoods (estimated at 5000 people, 5/household) (30% of support will target women specifically)	Community training, investment in livelihood inputs Surveys Annual Reports. Independent Evaluations	Communities are reluctant to adopt new land use practices and mangrove-supportive livelihood options due to, perceived risks to their income stability, and uncertainties over the market demand, and continue with activities which degrade mangrove areas.
	% change in household income, as a result of mangrove-supportive livelihoods activities implemented by the project	Baseline study to be conducted at start of project to assess current household income levels (see Annex H – Randomized Control Trials)	Positive % change in household income, specifically in households where women are engaged in mangrove-supportive livelihoods supported by the project (see Annex H – Randomized Control Trials)	Survey data (see Annex H)	Communities are reluctant to adopt new land use practices and mangrove-supportive livelihood options due to, perceived risks to their income stability, and uncertainties over the market demand, and continue with activities which degrade mangrove areas.
Outcome 3 Integrated approaches to coastal adaptation adopted to contribute to protection of coastal populations and productive lands	Number of funding mechanisms in support of improved coastal watershed management	Potential revenue streams identified in NBSAP, as well as PPG assessment, but not yet explored or tested.	At least one financing mechanism or plan with committed resources extending at least 2 years after the project end date	Budget detailing costs of mangrove protection, re-afforestation priorities, going forward (beyond the scope of the project). Funds (public and other) earmarked for mangrove and watershed protection activities.	Failure to identify viable revenue streams or secure funding for long term maintenance of mangrove areas and coastal watershed management.
	% target population aware of role of mangroves in coastal protection and coastal watershed protection	There is little-to-no educational or public awareness material, especially targeted at youth, about the role of mangroves in coastal ecosystems.	Approximately 250,000 people area reached through various public awareness raising means	Print material, videos (TV), community events to raise public awareness about the role of mangroves and broader watersheds in coastal protection, reaching especially youth and school-aged population in coastal areas Surveys and	Communication materials are not tailored to audiences or delivered in method appropriate to ensure outreach.

				community interviews on behavioural change. Annual Reports Independent Evaluations	
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ANNEX B.1: RESPONSES TO PROJECT REVIEWS (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF).

Review Criteria	Questions	Secretariat Comment at PID (PFD)/Work Programme Inclusion – to be addressed by CEO Endorsement	UNDP Response
Project Design	<p>8.a. Are global environmental/adaptation benefits identified?</p> <p>8.b. Is the description of the incremental/additional reasoning sound and appropriate?</p>	<p>By CEO Endorsement:</p> <p>There is quite a lot of emerging research on adaptation-related aspects of mangrove planting and restoration. Please do take into consideration climate change related factors (sea level rise, changing storm surge height, possible increase in intensity and/or frequency of coastal storms, etc.) when planning species selection (e.g. aerial root height), tree spacing, mangrove belt width and other factors.</p>	<p>Noted.</p> <p>Under Outcome 1, LDCF will support investments coastal mapping and in observation equipment, specifically tidal gauges. This is essential to identify suitable locations (i.e. distance from tides) thereby informing potential for success and sustainability of mangrove rehabilitation efforts.</p> <p>Previous rehabilitation efforts in Timor-Leste have largely failed due in part to incorrect rehabilitation techniques respective to the site (e.g. species selection, poor understanding of the hydro-ecological requirements of mangroves). The LDCF project will be informed by lessons learned and international best practices to ensure a high survival rate. This includes establishment of mangrove nurseries, so that seedlings grow to height where they can better withstanding regular tides before being transferred to the sites.</p> <p>Further, an expert will be recruited by the project to guide mangrove activities, as well as to develop national guidelines with MAF to strengthen institutional technical capacity, ensuring successful interventions going forward.</p>
	<p>10. Is the role of public participation including CSOs, and indigenous peoples where relevant, identified and explicit means for their engagement explained?</p>	<p>By CEO Endorsement:</p> <p>We are very pleased to note the additional focus on women in the revised PIF, particularly (i) their roles as beneficiaries, and (ii) consideration of gender-related concerns in assessments that will be undertaken during project preparation. By CEO Endorsement, please provide additional details on how women are consulted during project preparation, and on plan for their continued involvement.</p>	<p>Community consultations were conducted during project preparation, seeking specifically to engage with women to gather information about current livelihoods, and challenges they are facing, as well as to gauge potential of alternative livelihood options. The results of these consultations are detailed in Annex G.2, and have been integrated into the project design</p> <p>The livelihood support activities of the project set a target of 1000 households (or 5000 people) as beneficiaries, with 30% being women directly benefiting. Given the particular vulnerabilities of women in Timor-Leste, a gender specialist will be hired to ensure that consultations are conducted in a manner which is sensitive to these vulnerabilities, and that women are engaged in the planning, implementation and monitoring of project interventions.</p>

			To monitor success of livelihood interventions, gender disaggregated RCT surveys will be conducted, with adjustments to support made as necessary during project implementation, informed by RCT results and to ensure a high rate of success.
	11. Does the project take into account potential major risks, including the consequences of climate change, and describes sufficient risk mitigation measures? (e.g. measure to enhance climate resilience)	By CEO Endorsement: Please also discuss physical risks to the project (e.g. risks posed by increased severity/frequency of extreme events) and potential risks to sustainability of capacities built and to on-the-ground investments.	<p>Reducing impact of extreme events for coastal communities is a goal of the project, through the integration of coastal risks into planning, rehabilitation of mangrove areas to enhance shoreline resilience, and enhancements to protect broader watersheds.</p> <p>In the context of investments of the project, the potential of physical risks has been taken into account. Establishing mangrove nurseries so that seedlings are of a specific height before being planted at the site. This will ensure that seedlings are strong enough to withstand tidal cycles and waves. Where necessary, natural fencing will be put in place to further buffer tides and waves so that seedlings do not get washed away. These enhancements are the result of lessons learned and international best practices, which will contribute to the mangrove survival rate.</p>

ANNEX B.2: RESPONSES TO PROJECT REVIEWS (from GEF Secretariat prior to CEO Endorsement).

Review Criteria	Questions	Secretariat Comment at PID (PFD)/Work Programme Inclusion – to be addressed by CEO Endorsement	Secretariat Comment At CEO Endorsement(FSP)/Approval (MSP)	UNDP Response
Project Design	6. Is (are) the baseline project(s) , including problem(s) that the baseline project(s) seek/s to address, sufficiently described and based on sound data and assumptions?	<p>Yes, the baseline problems are sound. Timor Leste is a post-conflict and fragile Least Developed Country that is highly vulnerable to the combined adverse impacts of high climate variability (resulting in flash flooding, storms, and landslides), high deforestation rates, rapid infrastructure development (with consequent land clearing and disturbance of coastal settlements), and expansion of settlements towards coastal areas. Climate change will exacerbate issues relating to climate variability and sea level rise.</p> <p>The LDCF project will integrate climate resilience within the following baseline projects: (i) Agriculture Sector Development Midterm Operation Plan; (ii) National Natural Resource and Forest Management Through the State Budget; (iii) Nat'l and Int'l Environmental Management and Capacity Development Through the State Budget; (iv) Tibar Bay Port Construction Investment; and (v) UNDP project, Mobilizing Social Business to Accelerate the Achievement of Timor Leste's MDGs.</p>	<p>FI, 1/27/2016: Further detail requested. Please include information on how the LDCF project activities will provide additional adaptation benefits in the context of baseline activities. Please discuss LDCF project activities vis a vis the MTOP, EU's GCCA program, KOIKA support, and WorldFish activities. Perhaps a table could be included, showing the main activities of the baseline projects/initiatives and (in a separate column) additional adaptation aspects that are being financed by the LDCF grant.</p>	A table has been generated ,as suggested, to highlight the additional adaptation benefits of LDCF project activities . Please see Annex B.3.
			<p>FI, 3/3/2016: Yes, the requested information has been provided (Annex B.3).</p> <p>Note: Some of the Annex B.3 text on LDCF activities does not clearly specify that changing climatic conditions and the impacts they generate will be explicitly factored into the actions (e.g., in the first two paras corresponding to the MAF, and the WorldFish section). Please ensure that as the project moves forward, issues such as long term changes in tide patterns, and suitability for mangrove site selection, are fully taken into account.</p>	Noted.

Review Criteria	Questions	Secretariat Comment at PID (PFD)/Work Programme Inclusion – to be addressed by CEO Endorsement	Secretariat Comment At CEO Endorsement(FSP)/Approval (MSP)	UNDP Response
	7. Are the components, outcomes and outputs in the project framework (Table B) clear, sound and appropriately detailed?	<p>FI, 1/30/14: More information is requested regarding Component 2, towards which \$4 million of the requested \$7 million grant is being directed. Activities include (i) mangrove planting, and (ii) livelihoods diversification through social business in silvo-fisheries, agroforestry, sea-grass cultivation, and salt production. These seem to be relatively inexpensive activities. Recommended action (1/30/14, FI): Please provide more information on the types of investments that will be undertaken under Component 2 and why costs are expected to reach \$4 million. We have no objection to the amount being requested; our concern is that the measures should have significant impact. Update, FI, 3/3/14: Yes. Additional information has been provided on the apparently high costs for seemingly low-cost activities. The mangrove restoration and planting, for example, will be guided by GIS mapping (change in coastal profile and expansion of inundated areas), establishment of nurseries, rehabilitation of supporting hydrological features such as ponds and wetlands, and the cost of establishing mangrove-based social businesses and livelihoods for more than 20,000 people.</p>	<p>FI, 1/27/2016: Further information and/or revision requested. A) The number of beneficiaries in Table B sub-component 2.2 has been largely reduced from 20,000 people (PIF stage) to 1,000 households (approx. 5,000 people), although the LDCF amount for Component 2 remains unchanged. Please explain the reasons that such a drastic reduction has been proposed despite the sizeable (\$4M) LDCF resources allocated for Component 2. B) Please provide further information on the proposed infrastructure offset for coastal protection scheme, and PES (Table B Outputs for Component 3.3). What are specific next steps likely to be, and the final shape of these outputs? (Please provide information additional to that provided in Annex G.3.)</p>	<p>A) The Component 2 budget of \$4M includes mangrove rehabilitation and maintenance of 1000 hectares applying CBEMR, direct livelihoods support to 1000 households, robust analysis of interventions, public awareness and technical assistance to local authorities to integrate evidence-based best practices into suco development plans. The 1000 households (approx. 5000 people) refers only to households receiving direct livelihood support. Improved coastal protective measures will benefit larger populations residing in the target districts. Furthermore, by incorporating evidence-based best practices into suco development plans, the livelihoods introduced by the project can be upscaled to reach the total population in the target sucos (approx. 26,000 per 2010 Census).</p> <p>B) Given the rapid pace of infrastructure development, support is urgently needed to inform infrastructure offsets. As detailed above, monoculture regeneration as initially proposed for Tibar Bay, is not considered international best practices to ensure high survival rates, nor does the proposed offset consider risks of climate change-driven tidal activity and inundations. As with all forestry resilience efforts, diversity in species guarantees higher survival rates. Offsets will take into account, not only autecology (a pattern of mangrove reproduction), but also projected SLR and erosion rates, frequency of inundation, and potential for hydrological rehabilitation and tidal streams.</p> <p>There is not currently a lead ministry for</p>

Review Criteria	Questions	Secretariat Comment at PID (PFD)/Work Programme Inclusion – to be addressed by CEO Endorsement	Secretariat Comment At CEO Endorsement(FSP)/Approval (MSP)	UNDP Response
				<p>coastal areas; LDCF will support inter-ministerial coordination (Component 1) to ensure that offsets are not only well-designed but also consistent with the targets and policies of related ministries.</p> <p>In addition to such offset mechanisms the project will examine additional PES-like financial mechanisms to incentivize protection and rehabilitation of mangrove stands for their unique coastal protection services. Towards these aims further data collection is needed to further define potential revenue streams, this includes WTP surveys and economic valuation of mangroves. International expertise has been budgeted under Component 3 for this work.</p>
			<p>FI, 3/3/2016: Not yet. The LDCF grant amount corresponding to Outcome 2 appears high (\$4M). Please clarify whether the rehabilitation/restoration of 1,000ha of mangroves includes planting of new saplings using LDCF resources (and if so, on how many hectares of the 1,000). Comments (A) and (B) of 1/27/16 are cleared.</p>	<p>The portion of the budget specific to mangrove rehabilitation is \$1,330,000. This involved replanting of at least 500ha, natural regeneration of at least another 500ha, and maintenance for the duration of the project, all using the CBEMR approach and the necessary training for communities. The costs to successfully restore both the vegetative cover and ecological functions of a mangrove forest have been reported to range from USD\$225/ha to USD\$216,000/ha. (FAO, 2001). This is due to the different baseline condition of the mangrove areas and the success of interventions to address key drivers of mangrove loss.</p> <p>A conservative figure of \$1,330/ha was used, given the relatively good condition of existing mangrove areas in Timor-Leste</p>

Review Criteria	Questions	Secretariat Comment at PID (PFD)/Work Programme Inclusion – to be addressed by CEO Endorsement	Secretariat Comment At CEO Endorsement(FSP)/Approval (MSP)	UNDP Response
				and the extensive support (\$1,200,000) to be provided by the project for livelihoods alternatives and training to relieve community pressure on mangroves - the main driver of mangrove loss. The remainder is for technical expertise, analysis of interventions, public awareness and support to local authorities.
	10. Is the role of public participation, including CSOs, and indigenous peoples where relevant, identified and explicit means for their engagement explained?	Yes. A wide range of community consultations have been undertaken through the UNDP baseline project on social business development. FI, 3/4/14 -- by CEO endorsement: We are very pleased to note the additional focus on women in the revised PIF, particularly (i) their roles as beneficiaries, and (ii) consideration of gender-related concerns in assessments that will be undertaken during project preparation. By CEO endorsement, please provide additional details on how women are consulted during project preparation, and on plans for their continued involvement.	FI, 1/27/2016: Agency is requested to provide information on engagement with CSOs and how this engagement will be sustained during implementation.	<p>The Haburas Foundation has implemented mangrove restoration projects in Timor-Leste. Haburas was consulted during the PPG stage and has provided valuable input to the design of the LDCF project. Given their expertise and access to communities, Haburas may be engaged to implement mangrove restoration activities under the project.</p> <p>As project sites will be on both the North and South coasts of Timor-Leste, Field Coordinators will be hired by the project to facilitate engagement with communities, as well as with CSOs which provide support to those communities. For instance, community consultations indicated positive experiences working with local CSOs to establish home gardens and to learn crafts. Where appropriate, these existing links can be maintained and strengthened, or new relationships with CSOs established to support livelihood-related activities.</p> <p>The proposed project is also gender responsible in its adaptation strategy as it deliberately engages the female population to drive the proposed adaptation solutions. Women will particularly be involved in setting up mangrove nurseries and such mangrove-supportive social businesses,</p>

Review Criteria	Questions	Secretariat Comment at PID (PFD)/Work Programme Inclusion – to be addressed by CEO Endorsement	Secretariat Comment At CEO Endorsement(FSP)/Approval (MSP)	UNDP Response
				agroforestry and gardening. Women's role in stewarding the mangrove stands while creating new livelihood options for their families is a critical workstream under the Component 2.
			FI, 3/3/2016: Yes. The project has consulted with and may engage Haburas Foundation during implementation of mangrove restoration activities. It will also engage CSOs to support livelihood-related aspects.	Cleared.
Project Financing	16. Is the GEF funding and co-financing as indicated in Table B appropriate and adequate to achieve the expected outcomes and outputs?	FI, 1/30/14: More information is requested. Please refer to comment for Item 7, requesting details on LDCF financing for Component 2. Co-financing is appropriate and adequate. Update, FI 3/4/14: Yes. As discussed in updated (3/4/14) comment for Item 7, above, the proposed LDCF funding for Table B components is adequate.	FI, 1/27/2016: Please respond to comment (A) for Item 7, above.	The Component 2 budget of \$4M includes mangrove rehabilitation and maintenance of 1000 hectares applying CBEMR, direct livelihoods support to 1000 households, robust analysis of interventions, public awareness and technical assistance to local authorities to integrate evidence-based best practices into suco development plans. The 1000 households (approx. 5000 people) refers only to households receiving direct livelihood support. By incorporating evidence-based best practices into suco development plans, the livelihoods introduced by the project can be upscaled to reach the total population in the target sucos (approx. 26,000 per 2010 Census).
			FI, 3/3/2016: Not yet. Pending response to comment of 3/3/16 for Item 7, above.	The portion of the budget specific to mangrove rehabilitation is \$1,330,000. This involved replanting of at least 500ha, natural regeneration of at least another 500ha, and maintenance for the duration of the project, all using the CBEMR approach and the necessary training for communities. The costs to successfully restore both the vegetative cover and ecological functions of a mangrove forest

Review Criteria	Questions	Secretariat Comment at PID (PFD)/Work Programme Inclusion – to be addressed by CEO Endorsement	Secretariat Comment At CEO Endorsement(FSP)/Approval (MSP)	UNDP Response
				<p>have been reported to range from USD\$225/ha to USD\$216,000/ha. (FAO, 2001). This is due to the different baseline condition of the mangrove areas and the success of interventions to address key drivers of mangrove loss.</p> <p>A conservative figure of \$1,330/ha was used, given the relatively good condition of existing mangrove areas in Timor-Leste and the extensive support (\$1,200,000) to be provided by the project for livelihoods alternatives and training to relieve community pressure on mangroves - the main driver of mangrove loss. The remainder is for technical expertise, analysis of interventions, public awareness and support to local authorities.</p>
	17. At PIF: Is the indicated amount and composition of co-financing as indicated in Table C adequate? Is the amount that the Agency bringing to the project in line with its role? At CEO endorsement: Has co-financing been confirmed?	Co-financing is adequate at \$27,526,090.	<p>FI, 1/27/2016:</p> <p>Further information is requested:</p> <p>(1) Please discuss why UNDP is not contributing co-financing; and</p> <p>(2) Please explain whether the full range of activities for the KOICA and WorldFish projects will be relevant as baseline actions for the LDCF (since the specified co-financing contribution from these initiatives is their full amount).</p>	<p>(1) UNDP leveraged co-financing to the proposed project almost to the ratio of 1-5 and is greater than the amount presented in the PIF submission. Hence the project fully meets the co-financing requirement. Although the agency co-financing is not a requirement the UNDP Country Office in Timor Leste is committed to continue the efforts to leverage additional funding both from its own and other partners programme sources.</p> <p>(2) Both the KOICA and WorldFish programmes are focused solely on aquaculture development in the country - contributing to the GoTL's overall aquaculture targets. KOICA will establish an aquaculture training facility, initially for NDFA staff then communities. Similarly, WorldFish will work closely with NDFA</p>

Review Criteria	Questions	Secretariat Comment at PID (PFD)/Work Programme Inclusion – to be addressed by CEO Endorsement	Secretariat Comment At CEO Endorsement(FSP)/Approval (MSP)	UNDP Response
				to support aquaculture development as a livelihood for communities. As aquaculture, if not well planned, can exacerbate mangrove loss and further expose coastal communities to climate risks, close collaboration with these programmes is necessary to meet the meet the LDCF objective. Since both programmes are contributing to the baseline, both are fully counted as co-financing.
Project Monitoring and Evaluation	21. Have the appropriate Tracking Tools been included with information for all relevant indicators, as applicable?		FI, 1/27/2016: 1) Please also track the number of direct beneficiaries (Indicator 1); 2) Please ensure for Indicator 2 that the target at CEO Endorsement is greater than the baseline at CEO Endorsement. 3) Surely it would be relevant to also track, for Indicator 2, the km of coast made more resilient by the project? 4) Given the investments that will be made in hydromet services, please also select Indicator 7 or 8, as relevant.	Amended, as suggested. Please see Project Results Framework, edits highlighted in yellow.
			FI, 3/3/2016: Agency is requested to enter the "Baseline at CEO Endorsement" figure for Indicator 7 in the Tracking Tool. (Target at CEO Endorsement has been provided.)	Tidal information is not regularly collected to inform coastal planning, including mangrove re-afforestation efforts. The baseline is therefore stated as '0'.
Agency Responses	23. Has the Agency adequately responded to comments from:		FI, 1/27/2016: No. Unable to locate Agency responses to comments from Germany. Agency is requested to provide these.	N/A comments from Germany have not been identified in the UNDP's project registry.

Review Criteria	Questions	Secretariat Comment at PID (PFD)/Work Programme Inclusion – to be addressed by CEO Endorsement	Secretariat Comment At CEO Endorsement(FSP)/Approval (MSP)	UNDP Response
	<ul style="list-style-type: none"> • STAP? • Convention Secretariat? • The Council? • Other GEF Agencies? 		<p>FI, 3/3/2016:</p> <p>Not yet. Germany provided comments on this project in a letter dated July 30, 2014, logged in PMIS. Agency is requested to kindly respond.</p>	Provided as Annex B.4.

ANNEX B.3: CO-FINANCING TABLE DETAILING ADDITIONALITY

Name of Co-financier	Description	Additional Adaptation Benefits of LDCF Activities
MAF	The plan for the GoTL's rehabilitation and reforestation goals is detailed in MAF's Midterm Operation Plan (MTOP). With a budget of US\$18,000,000 until 2018, the MTOP seeks to establish management regimes and strategies for degraded coastal areas, and protection and conservation of biodiversity in forest and coastal areas. The plan also promotes local communities as stewards of their natural environment.	<p>The LDCF project will support climate-resilient planning by generating coastal maps and vulnerability assessments, further informed by tidal information collected through the installed gauges.</p> <p>The LDCF project will also develop mangrove restoration guidelines to ensure a high survival rate of related efforts going forward. These guidelines will be further informed by evidence generated through the project, which is applying a CBEMR approach – engaging communities and supporting livelihoods.</p> <p>Importantly, the LDCF project will establish intra-ministerial working protocols, ensuring that respective planning is complementary and integrates climate change risks faced by coastal communities.</p>
KOICA	The Korea International Cooperation Agency (KOICA) will provide vocational training on aquaculture, including a training-of-trainers programme for communities, in Timor-Leste over the next 4 years. Assessment of sites for an aquaculture training facility is currently underway. KOICA's budget for aquaculture support in Timor-Leste is US\$6,000,000.	The LDCF project will support integration of climate change impacts on coastal communities, the role of mangroves in coastal ecosystems, and more mangrove-friendly aquaculture approaches, into the curriculum to the extent possible. This includes as well sensitization of NDFA staff of these issues, to shape the KOICA course going forward as well as to inform aquaculture development in Timor-Leste overall.
WorldFish	WorldFish is a key partner to the government in developing aquaculture in Timor-Leste. WorldFish has worked with the government on the national aquaculture strategy and works with communities on implementing aquaculture activities. The ongoing budget for WorldFish in Timor-Leste is approximately US\$5,304,402 (i.e. NZD 5.1M, US\$1.5M, and AUD 600,000) over the next 4 years.	The LDCF project will support integration of protection of mangroves into aquaculture planning, to inform site selection, and where needed, support mangrove-friendly approaches to aquaculture (e.g. Forest-Fish-Fruit model).
GIZ - EU GCCA	The European Union's (EU) Global Climate Change Alliance (GCCA) programme to Timor-Leste, through GIZ and Instituto Camões, seeks to strengthen the capacity of populations vulnerable to climate change risks to cope with climate change effects through the sustainable management of natural resources and the improvement of livelihood options. The programme will also invest in awareness raising activities on climate change and	GIZ interventions are focused largely on upland sustainable land management activities to reduce soil erosion and minimize excess water runoff – both risk factors to coastal communities. The re-forestation activities in coastal areas, under the LDCF project, will reduce coastal erosion. Combined, these activities look at the broader landscape, introducing nature based approaches to strengthen resilience and protection of coastal communities – in

Name of Co-financier	Description	Additional Adaptation Benefits of LDCF Activities
	its impacts, and promoting/providing training on forestry production (e.g. for enhancing the production capacity of national and community nurseries, improving planting success rates) and agroforestry (e.g. intercropping, forest gardening for non-timber forest products) as a response to land degradation. The programme is planned until 2018; the largest allocation related to the GIZ implemented portion has a total budget of approximately US\$2,340,000 (i.e. €2.2million).	line with the LDCF project objective.

ANNEX B.4: AGENCY RESPONSES TO COUNCIL COMMENTS - GERMANY

Comments from Council Members: Germany	UNDP Response
<p>Germany welcomes the coherent project structure outlined in the PIF and in particular appreciates that it directly responds to NAPA priorities, that it aims to clarify roles and strengthen coordination among government bodies and that it strongly addresses gender aspects. Furthermore, Germany appreciates references made to the National Adaptation Plan process and encourages the project to coordinate its activities accordingly and, where possible, seek ways to support relevant parts of the NAP process, in particular in regard to coastal management.</p>	<p>Noted. The need for coordination with the NAP process has been highlighted, and entry points for collaboration have been established.</p> <p>For instance, to develop the coastal management and adaptation plan under Outcome 1, inter-ministerial coordination and agreement is necessary. Various technical working groups will be engaged for this effort, including the technical working group for NAP. Related capacity support will be developed into courses and made available at the National University of Timor-Leste/Universidade Nacional Timor Loroa'se (UNTL) to ensure broad accessibility.</p> <p>This project will also be closely coordinated with the proposed <i>Developing capacities for iterative National Adaptation Planning (NAP) process for climate resilient development</i> project which will build capacity in adaptation planning, budgeting, implementation and monitoring, and improve individual and institutional capacities to deliver climate services for adaptation planning across priority sectors. Importantly, the project will support the development of a NAP to establish the institutional, policy and fiscal framework for climate change adaptation planning. The proposed project is currently under consideration by the GEF Secretariat.</p>
<p>Germany appreciates that the PIF aims to follow the principles of Integrated Coastal Management (ICM). In addition to the proposed shoreline management plan it is suggested to put additional emphasize on how aspects of integrated coastal management could be mainstreamed into relevant existing planning and budgeting processes at sub-national level. This could be done in relation to output 2.3 and may help in upscaling methods used and lessons learned in the ten villages.</p>	<p>Noted. Output 2.3 <i>In project site sucos, development plans include mangrove-supportive livelihood support measures benefiting at least 26,000 people</i>, focuses on integrating the positive results of robust livelihoods analyses (i.e. randomized control trials) into suco development plans in order to formally request further investment by the State budget for upscaling.</p> <p>In addition, mangrove and wetland mapping, monitoring and coastal change assessments will be conducted, with results used to inform suco development plans.</p>
<p>The project intends to deliver trainings to build technical skills (output 1.3). However, these capacity building efforts seem to focus predominantly on the use of technological equipment and hardware. It is suggested that under outcome 1 "Policy framework and institutional capacity for climate resilient coastal management" greater emphasis is placed on building the capacity of government staff at national and sub-national level to enable implementation of the newly developed coastal management plan and ensure its enforcement.</p>	<p>Noted. Capacity support under Output 1.3 has been further expanded, in consultation with government counterparts, to now include:</p> <ul style="list-style-type: none"> • Sensitizing policy makers on the importance of mangroves and coastal wetlands (an ecosystem-based approach) in climate change adaptation • Training coastal management and cost-benefit analysis (CBA) for government staff to inform efficient and effective adaptation planning. <p>This will be done in partnership with University of Timor-Leste's Centre</p>

Comments from Council Members: Germany	UNDP Response
This would also contribute to output 1.4.	<p>for Climate Change & Biodiversity to ensure availability and accessibility of course material – thus ensuring sustainability of training efforts.</p> <ul style="list-style-type: none"> • Detailed guidelines on mangroves for coastal defense tailored to different target audiences – i.e. for coastal managers and policy makers, sub-national government staff, as well as for local communities.
The PIF does not include any specific statement on how knowledge generated as part of the project will be documented and made available nationally and internationally. Germany kindly asks to outline how the project will approach knowledge management and disseminate lessons learned to stakeholders.	<p>Noted. Given Timor-Leste's oral tradition, the need to document knowledge was also stressed by MAF. UNTL's Centre for Climate Change and Biodiversity houses studies and research related to biodiversity and climate change. The project design captures the role of the Centre's as the repository for information and data in Timor-Leste. All knowledge generated by the project will be tailored and made available to target audiences, as well as stored at the Centre for access as well as integration into course material.</p> <p>Further, results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums, as part of UNDP standard practice. The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects. Finally, there will be a two-way flow of information between this project and other projects of a similar focus.</p>

ANNEX C: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS⁷⁰

A. Provide detailed funding amount of the PPG activities financing status in the table below:

PPG Grant Approved at PIF: \$150,000			
<i>Project Preparation Activities Implemented</i>	<i>GEF/LDCF/SCCF Amount (\$)</i>		
	<i>Budgeted Amount</i>	<i>Amount Spent To date</i>	<i>Amount Committed</i>
Technical review	90,000	74,282.40	15,717.60
Institutional arrangements, monitoring and evaluation	35,000	28,474.92	6,525.08
Financial planning and co-financing investments	10,000	8,666.28	1,333.72
Validation workshop	5,000	3,714.12	1,285.88
Completion of final documentation	10,000	8,666.28	1,333.72
Total	\$150,000	123,804	26,196

* Activities correspond to the Components detailed in the PPG Initiation Plan

PPG funds provided for technical expertise to inform project develop (i.e. Project Development Specialist, Ecosystems Specialist, Livelihoods Specialist), stakeholder consultations and inter-ministerial workshops. Input was sought from stakeholders and potential beneficiaries during the project preparation phase at the Inception Workshop held on 12 February 2015 as well as through individual consultations and fieldwork surveys in the months that followed.

Consultations captured views from government ministries, suco heads, community members, district departments and municipalities, development partners, NGOs, and INGOs. Field visits and community consultations were undertaken on the North coast: Tibar Bay, Liquica, Biqueli, Atuario, Dili, Hera, Metinaro, and Vermasse; and on South coast: Irabin leteria, Irebere, Ilomar, Vessuro, Beço, Uaitame, Natarbora, Clacuc, Kicras, Welaluhu, Fatucahi, Betano, Beço, Suai, Rib Tafera and Cova Lima.

Additional cost-sharing support was provided by UNDP and USAID Adapt Asia-Pacific, which resulted in additional expert inputs from a Gender Specialist, an Ecosystems/Mangroves Specialist and a PES Specialist.

⁷⁰ If at CEO Endorsement, the PPG activities have not been completed and there is a balance of unspent fund, Agencies can continue to undertake the activities up to one year of project start. No later than one year from start of project implementation, Agencies should report this table to the GEF Secretariat on the completion of PPG activities and the amount spent for the activities. Agencies should also report closing of PPG to Trustee in its Quarterly Report.

ANNEX D: CALENDAR OF EXPECTED REFLOWS (if non-grant instrument is used)

Provide a calendar of expected reflows to the GEF/LDCF/SCCF Trust Funds or to your Agency (and/or revolving fund that will be set up)

N/A