



GEF-6 PROJECT IDENTIFICATION FORM (PIF)

PROJECT TYPE: MEDIUM-SIZED PROJECT

TYPE OF TRUST FUND: GETF

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PART I: PROJECT INFORMATION

Project Title:	Reducing Climate Vulnerability of Coastal Communities of Myanmar through an Ecosystem-based approach		
Country(ies):	Myanmar	GEF Project ID: ¹	TBD
GEF Agency(ies):	UNDP	GEF Agency Project ID:	5101
Other Executing Partner(s):	Ministry of Environmental Conservation and Forestry	Submission Date:	30 April 2015
GEF Focal Area(s):	Climate Change	Project Duration (Months)	60
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:	NA	Agency Fee (\$)	667,946

A. INDICATIVE FOCAL AREA STRATEGY FRAMEWORK AND OTHER PROGRAM STRATEGIES²

Objectives/Programs (Focal Areas, Integrated Approach Pilot, Corporate Programs)	Trust Fund	(in \$)	
		GEF Project Financing	Co-financing
CCA-1: 1.1 Mainstreamed adaptation in broader development frameworks at country level and in targeted vulnerable areas	LDCF	1,880,405	5,800,000
CCA-2: 2.2 Strengthened adaptive capacity to reduce risks to climate-induced economic losses	LDCF	5,150,605	16,000,000
Total Project Cost		7,031,010	21,800,000

B. INDICATIVE PROJECT DESCRIPTION SUMMARY

Project Objective: To strengthen the protection of vulnerable coastal areas and communities against the adverse impacts of climate change and climate variability by adopting an ecosystem based adaptation approach in the Rakhine State of Myanmar

Project Component	Financing Type ³	Project Outcomes	Project Outputs	Trust Fund	(in \$)	
					GEF Project Financing	Co-financing
1. Climate change adaptation in coastal areas is mainstreamed into local and national development planning frameworks	TA	<p>Reduced vulnerability across the coastal areas in Myanmar from predicted CC impacts (increase in temperatures, increased intensity of storms, increased frequency of floods, cyclones) by safeguarding, improving and restoring ecosystem functionality and connectivity of 1280 ha of 12.8 square km mangroves in coastline</p> <p>Key stakeholders are better able to identify, manage and monitor climate risks to coastal areas as measured by at least 15% increase in UNDP Capacity Scorecard – baseline to be established during PPG</p>	<p>1.1 Decision making tools for planning, management and enforcement strengthened to ensure that infrastructure, productive /extractive activities and habitat clearance are not affecting strategic coastal ecosystems and communities vulnerability to increased climate risks (including SEA of cumulative impacts of climate risk and development programmes; vulnerability mapping and generation of GIS information; integration of EBA measures into engineering solutions; integrated coastal area management plan for the Rakhine area that defines no-go areas for development, delineates areas for different sectors and makes SEA mandatory)</p> <p>1.2 Sectoral guidance and regulations issued by the Rakhine State government to all townships to strengthen the local control and prevention of climate impacts in vulnerable coastal areas (this will include proscriptions and recommendations for sectors; regulations and governance arrangements for mangrove forest management</p>	LDCF	1,713,000	5,800,000

¹ Project ID number will be assigned by GEFSEC and to be entered by Agency in subsequent document submissions.

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

³ Financing type can be either investment or technical assistance.

			including community involvement) 1.3 Establishment of cross-sectoral institutional coordination mechanism for planning, funding, implementation, monitoring and enforcement of coastal adaptation plans; targeted training programmes for staff of key government agencies, NGOs related to climate induced risks to coastal areas and on ecosystem based adaptation; enhancing capacities of local communities on coastal area management, mangrove rehabilitation and management)			
2. Strengthened coastal resilience and improved ecosystem integrity and functionality	TA	The climate resilience of targeted vulnerable coastal sites that support community livelihoods and provides important coastal protection is strengthened by focusing on vulnerable natural and social assets – this is evidenced by: a) 1566 ha of improved mangrove area managed by community-based institutions; b) reduction in coastal erosion and siltation ⁴ ; c) adoption of climate resilient crop, livestock and fishery practices by 6000 households; d) at least 20 percent increase in income from baseline (to be assessed during the PPG) of participating farmers	2.1 Strengthened resilience of mangrove ecosystem in four townships (Kyauk Phyu, Yanbye, Myay Bone, Mann Aung) as follows: improved connectivity of critical mangrove ecosystems through 1566 ha of newly established mangrove area; protection elevated of mangrove area by declared as community mangrove conservation area (1200 ha); and improved management of buffer zones (305) including establishing trial plantations (61 ha) to enable selection and use of climate resilient mangrove varieties and plantation techniques 2.2 Climate resilient agricultural practices and sustainable alternative livelihoods promoted including: climate resilient crops, agronomic practices to reduce crop failures (e.g. saline resilient rice varieties, crop rotations; alternative livelihoods and employment that diversify farm income and reduce risks (e.g. integrated fish fruit and forest farming; improved livestock rearing; engagement in eco-tourism activities)	LDCF	3,473,200	10,550,000
3. Strengthened links between disaster risk reduction and livelihood, ecosystem	TA	Coastal mangrove ecosystems, communal livelihoods and lives are protected from extreme climate events – this can be measured by: a) improved disaster preparedness as indicated by number of people with access to EWS info (baseline and target to be set during PPG) b) interest in lessons sharing platforms – e.g. websites, workshops indicated by number of visits to the websites, or information request / demands from coastal stakeholders	3.1 Effective community level disaster management and early warning system including locally appropriate systems to disseminate information and appropriate community level disaster management structures set up in the four townships 3.2 Knowledge management mechanism in place for documentation, sharing of lessons and best practices on mangrove afforestation and management, community based adaptation practices	LDCF	1,510,000	4,350,000
Subtotal					6,696,200	20,700,000
Project Management Cost (PMC) ⁵				LDCF	334,810	1,100,000
Total Project Cost					7,031,010	21,800,000

⁴ The means of measurement, baselines and targets will be determined in PPG

⁵ 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.

C. INDICATIVE SOURCES OF CO-FINANCING FOR THE PROJECT BY NAME AND BY TYPE, IF AVAILABLE

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Amount (\$)
National Government	Ministry of Environmental Conservation and Forestry (MoECAF)	In-kind	1,500,000
National Government	Department of Agriculture	In-kind	3,000,000
National Government	Department of Fisheries	Grant	300,000
National Government	Relief and Resettlement Department	In-kind	3,000,000
National Government	Department of Meteorology and Hydrology	In-kind	300,000
State Government	State administration	In-kind	500,000
GEF Agency	UNDP Myanmar	Grant	2,000,000
Bilateral Agency	JICA	Grant	10,000,000
NGO	Mangrove Service Network (MSN)	Grant	1,200,000
Total Co-financing			21,800,000

D. INDICATIVE TRUST FUND RESOURCES REQUESTED BY AGENCY(IES), COUNTRY(IES) AND THE PROGRAMMING OF FUNDS ^{a)}

GEF Agency	Trust Fund	Country/Regional/Global	Focal Area	Programming of Funds	(in \$)		
					GEF Project Financing (a)	Agency Fee (b) ^{b)}	Total (c)=a+b
UNDP	LDCF	Myanmar	Climate Change		7,031,010	667,946	7,698,956
Total GEF Resources					7,031,010	667,946	7,698,956

a) Refer to the [Fee Policy for GEF Partner Agencies](#).

E. PROJECT PREPARATION GRANT (PPG)⁶

Is Project Preparation Grant requested? Yes No If no, skip item E.

PPG AMOUNT REQUESTED BY AGENCY(IES), TRUST FUND, COUNTRY(IES) AND THE PROGRAMMING OF FUNDS

Project Preparation Grant amount requested: \$150,000					PPG Agency Fee: \$14,250		
GEF Agency	Trust Fund	Country/Regional/Global	Focal Area	Programming of Funds	(in \$)		
					PPG (a)	Agency Fee ⁷ (b)	Total c = a + b
UNDP	LDCF	Myanmar	Climate Change		150,000	14,250	164,250
Total PPG Amount					150,000	14,250	164,250

F. PROJECT'S TARGET CONTRIBUTIONS TO GLOBAL ENVIRONMENTAL BENEFITS⁸

Provide the expected project targets as appropriate.

Corporate Results	Replenishment Targets	Project Targets
2. Sustainable land management in production systems (agriculture, rangelands, and forest landscapes)	120 million hectares under sustainable land management	1280 ha of mangrove forests

⁶ PPG requested amount is determined by the size of the GEF Project Financing (PF) as follows: Up to \$100k for PF up to \$3 mil; \$150k for PF up to \$6 mil; \$200k for PF up to \$10 mil; and \$300k for PF above \$10m. On an exceptional basis, PPG amount may differ upon detailed discussion and justification with the GEFSEC.

⁷ PPG fee percentage follows the percentage of the Agency fee over the GEF Project Financing amount requested.

⁸ Provide those indicator values in this table to the extent applicable to your proposed project. 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. There is no need to complete this table for climate adaptation projects financed solely through LDCF and/or SCCF.

PART II: PROJECT JUSTIFICATION

1. Project Description.

Summary: The proposed project seeks to reduce the vulnerability of communities in coastal areas of Myanmar at risk from climate change – the bulk of the populace lives in the coastal fringe. Myanmar is seeking to enhance the functionality and resilience of mangroves in this area to respond to the projected impacts on resident communities from these projected climate change impacts. The strategy of the project is to build on baseline investments in coastal protection through additional investment in the restoration and protection of ecosystems whose services enhance resilience in the coastal zone to climate change impacts through the regulation of water flows and the prevention of floods, erosion and saltwater intrusion. The project will undertake activities to: mainstream EBA approaches into national development policies, laws, and institutional functions; strengthen the capacities and knowledge required for effective and participatory EBA approaches; and to link EBA activities to disaster risk reduction efforts such as Early Warning Systems (EWS) and lessons documentation and sharing. In doing so, the project will introduce EBA as an integral component in the country's approach to climate change adaptation, thereby strengthening recognition of the importance of natural ecosystems for climate change risk management, as well as maintenance of socio-economic benefits and conservation of biodiversity.

In Myanmar (and specifically in the Rakhine State), EBA approaches will include afforestation, restoration and conservation of mangrove forests along the coastline and riverbanks; and conservation and management of buffer zones to conserve natural barriers to flooding and saltwater intrusion, and to conserve and enhance hydrological functions necessary to minimize flooding from intensified rainfall events, provide water resources during longer dry periods, and provide sufficient water flows to sustain mangroves. The underlying motive for these EBA approaches is to mitigate the impact of sea level rise and coastal storms. However, these approaches are situated in a context that includes numerous stakeholders with a diverse set of interests and diverging priorities and preferences, without whose participation and support the project cannot succeed. For this reason, climate change adaptation actions implemented by the project will also ensure a continuing capacity for ecosystem services to generate benefits and development pathways for Myanmar's coastal population, through maintenance of existing socio-economic opportunities (e.g. agriculture, fisheries and tourism) as well as capacity building and job creation to create new opportunities. By offering significant training and employment opportunities for local inhabitants at the project field sites, as well as a role in determining local resource management priorities and policies, the project will generate opportunities for stakeholders in these typically poor rural communities to participate in decision-making, improve their business acumen, and implement EBA practices to strengthen the resilience of the ecosystem services upon which they depend.

Myanmar is requesting support from the LDCF to implement a broad ecosystem-based adaptation approach to restoring and strengthening ecosystem functionality and enhancing ecosystem resilience to climate variability and climate change to secure and enhance critical ecosystem services (coastal protection and water regulation/flood attenuation). The project will invest in restoring and expanding the mangrove afforestation / reforestation techniques and adapting these by incorporating best practices from around the world; in ensuring that ecosystem resilience building for enhanced benefits to disadvantaged and vulnerable communities are an integral part of climate change adaptation options; and in integrating EBA approaches into the country's development planning and financing framework, so that coastal development plans and activities include the restoration and protection of ecosystems and generate funding to assure sustainability.

Problem Definition: Myanmar is characterized by topography that is generally low in the coastal regions with a long coastal line of more than 2832 km in length. The extent of mangrove coverage along the coastline is around 785,000 ha. In the coastal areas, estimated annual rainfall is as high as 5,000 mm and while the continental shelf covers 270,000 km² in the area of Rakhine coast, the Delta region and along the Tanintharyi coast. Around three-quarters of the country lies in the tropical region with a dominant tropical monsoon climate while the southern monsoon advances from the southern parts of the country where weather systems originating in the Pacific Ocean traverse the Myanmar landmass and emerge into the Bay of Bengal, as cyclonic storms causing heavy rainfall spells. Of three coastal zones, Rakhine State, situated along the Bay of Bengal Sea where tropical cyclone is generated, has a relatively rich coverage of mangroves estimated to be around 170,000 ha. This mangrove ecosystem not only provides breeding ground and habitats for aquatic and inland animals but also acts as shelter for coastal area from the effects of storm surge, cyclones, coastal erosion, thus it stabilizes shorelines and assure the community based ecotourism development activities. Mangrove ecosystem plays a vital role in support of regulating ecosystem services such as soil-water quality retention, and reduced impacts from or exposure to climate change induced problems including storm surges and sea water floods. These ecosystems are also important livelihood sources for the coastal communities.

Myanmar ranks among the world's top countries at most risk from the potential combined effects of climate change (mainly in terms of sea level rise, agricultural productivity loss) and extreme weather events. Sea level rise along the

coasts of Myanmar are projected to rise by about 150 mm by 2030 and up to 450 mm by 2070 while global sea levels rise is at 1.7 ± 0.5 mm/yrs. in 20th century (IPCC, 2007). Likewise sea water inundation over the paddy field is a critical problem – this results in declining agricultural productivity making the coastal farmers more vulnerable to climate change impact⁹. Among three coastal regions, the proposed coastal region (Rakhine State) is most frequently struck by cyclones. It suffered from recurrent occurrences of cyclones, severe flood, and mudslides that have impacted the state in terms of huge economic damage and loss of lives over the years¹⁰. Further, to make matters worse, the Rakhine State is one of the least developed areas in Myanmar, characterized by high population density, malnutrition, low income poverty and poor infrastructure¹¹. According to the Integrated Household Condition Survey (2009-2010), the Rakhine state has the second highest poverty incidence at 43.5% compared to 25.6% national poverty head count. The area also has one of the highest food poverty (10% of food poverty against the national average of 4.8). Climate change projection for Myanmar predicts the increased intensity and frequency of extreme weather events and climate change variability in the period of 2001 and 2100 (NAPA, Myanmar, 2012). Further, climate change simulation model indicates the significant increase in temperature and shorter length of rainy season (14 days shorter than normal days). The aggravating factor of sea surface temperature rise cause storms where cyclones and hurricanes are projected to be intensified in the Rakhine coastal regions.

As alluded to earlier, this is of much concern. The mangrove ecosystems support a large number of rural communities. The loss of mangrove forest inadvertently impacts on the breeding grounds of fish and prawn which the coastal communities are largely dependent as it is a major diet and source of income for their livelihoods. Further, in the light of fresh water scarcity in summer, a single cash crop per year grown in this State, which is increasingly threatened by salt water intrusion making the land unsuitable for agriculture; making farmers even more reliant on mangrove forest resources, aquatic and inland animals and to a large extent aquatic farming (supported by the mangrove ecosystem). Thus, the loss of mangroves and increased incidence of extreme weather events will have serious impacts on the coastal farmers who: disproportionately depend on climate sensitive natural resources such as agriculture, fisheries and forestry based resources in particular the poorer members of the local communities who have very limited options for their livelihood. In addition as just described, the Rakhine State is highly vulnerable in terms of natural disasters such as cyclones, flooding and mudslides arisen from climate change and its variability impacts. This is compounded by the fact that the State has very high levels of poverty incidence rate and dependence on sectors that are extremely climate sensitive. This speaks to the pertinent need to improve coping strategies and actions for climate induced threats in order to ensure that coastal communities are not further impoverished and the very limited development gains made in the area are secured.

Despite this importance, like in other coastal regions, in the Rakhine area, around 65% of mangroves have been cut down to make room for commercial shrimp farms, and to a lesser extent, brick-making¹² (estimated by the Network on Environmental and Economic Development - NEED). The National Environmental Performance Assessment (EPA) also highlighted shrimp farming has become one of the main contributors to the loss of mangrove coastal area¹³. The Forest Department's Statement issued in 2005 revealed that the mangrove forest in Rakhine State is severely degraded¹⁴ and 65% was deforested in low lying coastal mangrove reserved forest area which had been transformed into agricultural land and shrimp farming following the over exploitation for firewood and urbanization¹⁵. In addition recent satellite image analysis and vulnerability map using NASA earth observations in 2014 revealed that Rakhine lost the most mangroves in the country at about 782 km² among three coastal regions.

As such, the problem this project seeks to address is to enhance, manage and protect the mangrove ecosystems that local communities depend on for their livelihoods while these mangrove landscapes and ecosystems are also extremely important to protect them from climate change impacts including extreme climate events such as storms, cyclones and floods. It is clear that strengthening climate change adaptation capacities in the coastal areas has to include a strong focus on rehabilitation, management and protection of the mangrove ecosystems as an integral part of any adaptation strategy. Local communities and other stakeholders should be supported to enhance their capacity to undertake such actions

⁹ Land Use Suitability Analysis undertaken by the researchers at Rakhine State has shown that the rice productivity declines seriously from 60 baskets per acre to 20 baskets per acre due to the salt water flooding.

¹⁰ The tropical cyclones constitute about 10% of disasters of Myanmar coastal region as per data from 1996 and 2005 (Hazard profile in Myanmar). During the period of 1887 and 2005, 1248 tropical storms were formed in the Bay of Bengal, of which, 80 storms (6.4 percent) struck the Myanmar coast, mainly Rakhine State. Sittwe cyclone occurred (Rakhine State) in 1968 claimed maximum death toll of 1037. The recent two major disasters in the proposed State - landslides and flood in June 2010 and Giri cyclone in October 2010 caused the loss of lives and livelihoods of 29,000 and 260,000 people respectively. The highest frequency of storms and loss of lives occurred recurrently in Rakhine State.

¹¹ Inter-Agency Preparedness/Contingency Plan- Rakhine State, Myanmar, March 2013

¹² Myanmar Environmental Working Group (2009), Accessible Communities Contribution to Social Development and Environmental Conservation in Myanmar

¹³ Burma Environmental Working Group (2011), Burma Environment, People, Problems and Policies

¹⁴ The survey conducted by MERN in 2012 revealed that only 35 mangrove tree species were found out of the taxonomically recorded 98 species in Rakhine State where growing stock density declined triples from 44 to 14 sq. feet per acre.

¹⁵ In accordance with Forest Department's Statement in 2005, a critically important reserved forest contain only one third of good forest.

including also greater involvement of local communities as co-managers of mangrove forest areas. In addition, adaption strategies in coastal areas need to include coordinated actions to improve, upgrade and diversify livelihood options to reduce dependence on a single livelihood base. In the short-term project activities such as mangrove afforestation and management will generate employment and additional income to local communities. The restoration of mangrove forests that are climate-resilient and effectively managed to generate ecosystem services will reduce the vulnerability of local communities to climate change. Restoring forests with climate-resilient species that provide ecosystem services benefits both the environment and community livelihoods including agriculture thereby supporting long-term community adaptation and resilience for a relatively small investment. In this way, EbA provides a low-cost and effective approach to adapting to climate change. Furthermore, efforts to rehabilitate and manage mangrove forests should be well integrated into other climate change adaptation actions at the national and local levels including linking to early warning systems (EWS) and make efforts to ensure that coastal areas and local communities are plugged in and receive appropriate climate and agro-meteorological information (that is readily understandable and usable) – timely delivery of such information will not only be critical to protect lives and livelihoods but will also enable local communities to plan their agricultural activities accordingly.

Threats to the mangrove ecosystems in the project area: The project will focus specifically on an 12.8 km² long stretch of coastline, covering 1280 ha, in four townships (Kyaukphyu, Myaybone, Mann Aung and Yanbye) in the Rakhine state. This coastline is comprised of a large coastal area (2832 km in length) dominated by mangroves. This is one of the most vulnerable areas in the country to tropical storms and hurricanes, and associated storm surges and cyclones. It is particularly subject to the problem of saline intrusion into its subterranean aquifers, which are vital for the irrigation of the coastal plains, some of the most productive agricultural in the country, in particular for rice and other cereal crops.

Along with the increasing population, agricultural expansion, firewood cutting, illicit logging, and expansion of agricultural areas for shrimp farming are resulting in deterioration of natural resources, (forest, soil, water, and so on) and greenhouse gases emissions. With annual forest loss about 12,000km² the country has around one of the highest deforestation rates in the world. Further, mangroves may be affected by climate change-related increases in temperature and sea-level rise. Although the temperature effect on growth and species diversity is not known, sea-level rise may pose a serious threat to these ecosystems. The expected impacts included disappearance of major mangrove species as saline water front moves further inland. These changes could result in economic impacts: mangrove forests provide the mainstay livelihood source to about 80,000 people engaged in various activities (e.g. woodcutting; collection of thatching materials, collecting shells; fishing) which if mangrove ecosystem was damaged from climate change impacts, they stand to lose their sources of livelihood and income. Sea-level rise may also threaten a wide range of mammals, birds, amphibians, reptiles, and crustaceans living in the mangrove ecosystem. Further there is clear evidence that in those parts of the coast with intact mangrove forests, there have been less impacts from CC-related phenomena than those that have undergone significant anthropogenic modification, due largely to the role of mangroves in retaining sediment and buffering wave impact. Furthermore, coastal areas that are covered by mangroves are generally less degraded than those that are not. The project is designed to enhance the ability of ecosystems to supply this buffering function.

Long-term solution and barriers to achieving it: Given the above and the limitations of structural coastal protection measures, the Government of Myanmar had identified the long-term solution as a combined approach to adaptation using both strengthened ecological infrastructure (mangrove rehabilitation) and enhanced local capacity to deal with climate induced disasters. However, a number of barriers exist which prevent Myanmar from effectively implementing ecosystem-based adaptation measures that would resolve the climate change-induced vulnerabilities noted above.

Barrier 1: No integration of CC into coastal area development, inadequate institutional coordination and lack of/limited enforcement of regulations on land use permitting and natural resource use: Some of the most significant negative impacts to which the coastal ecosystems of the project area have been subjected to date, such as the destruction of mangroves for the construction of the coastal road and for expansion of economic activities such as shrimp farming can be explained by a failure to apply a fully integrated vision to the planning of productive activities in the coastal zone, or to develop adequate levels of awareness of the importance of coastal ecosystems among local stakeholders engaged in productive activities (members of local communities and productive sector entities). Each of these activities was planned and executed with a narrow and sector-specific vision which failed to consider the longer term benefits and cost-effectiveness of avoiding damage to ecosystems which have potential to provide EBA services. This situation is compounded by the limited levels of awareness that exist in local communities regarding climate change and EBA. There is limited understanding among members of local communities of how individual short-term climatic phenomena fit into the long-term pattern of climate change, and the long-term cumulative implications of CC trends. At the institutional level, numerous institutions have responsibilities for development, resource management, and conservation in the coastal zone, yet coordination among these institutions is very weak. Local level managers and staff generally do not communicate or coordinate with their

counterparts in other institutions. Even at the national level, coordination and information sharing among ministries and agencies is poor. National and sub-national level legal and regulatory tools for effective land and resource management that are ostensibly expected to protect natural ecosystems and resources such as mangrove restoration law and fishery law are not adequate. In fact some of these regulations are contradictory for example between fishing right and reserved forest regulations, zoning for coastal areas restrictions on resources use such as fishing, agriculture, local right). There are also no regulations on zoning of coastal areas while developments in the coastal areas including economic activities (e.g. shrimp farming) and large infrastructure development (construction of roads) are not restricted through any systemic mechanisms including a well thought out coastal development plan.

Barrier 2: Limited know-how and EBA examples demonstrating value of mangroves for coastal protection and increasing the resilience of coastal communities: Despite the significance and important role that mangrove forests and ecosystems play in protecting the coastal areas and providing important livelihood source for majority of the coastal communities, there is currently no discernible efforts made to protect these ecological infrastructure. In addition, there are currently no examples of Ecosystem-based Approaches to Climate Change Adaptation (EBA) interventions that policy makers and government field programme implementers can learn from. As stated earlier most government programmes in the coastal areas (in the area of agricultural development, rural development, relief, livestock promotion etc.) continue to be implemented with no awareness of or regard to expected climate change impacts. Likewise local communities and township level authorities have neither capacities nor the technical know-how to identify, select and adopt practices in livelihood activities such as use of appropriate crops varieties (e.g. saline resilient rice varieties) and different agronomic (e.g. crop rotations) and livestock practices (e.g. adopting different breeds or feeding practices; integrated farming) that are climate resilient. Besides, in the face of climate change and the unpredictable nature of its impacts, diversification of livelihood and income sources should be promoted as an integral part of any adaptation strategy. Finally there is also a need to enhance capacities at the level of local communities for collective action for community-based natural resource management such as for mangrove afforestation and management through strengthening/promoting traditional institutions (or those sponsored by recent government programmes e.g. community forestry groups). Activities promoting collective action in natural resource management is beneficial for not only improving the natural ecosystem (e.g. mangrove forests), but will also increase social capital within the communities for future cooperation and collaboration such as maybe required for disaster preparedness and response to emergency situations.

Barrier 3: There is currently no systemic link between timely dissemination of weather information, early warning efforts with programmes on afforestation/reforestation and other livelihood support activities so that coastal community ecosystem and physical infrastructure and lives of local communities are protected from extreme weather events: A lack of capacity among resource managers and potential local partners (community leaders, local inhabitants) who could lead / participate in EBA approaches, in particular integrated planning for hydrological services, ecosystem and water resource dynamics and thresholds under conditions of climate change, and ecological restoration practices, further constrains efforts to demonstrate such approaches along the coastal line in Rakhine State. There is also a general lack of appreciation of the range of climate induced impacts on local ecosystems and livelihood base and activities including an absence of any systemic approach to generate and disseminate agro-meteorological information in an effective, meaningful and efficient manner. Much of the agro-meteorological information when available reside with technical departments based at the national level with in-efficient modes of transmission reliant on traditional 'line of command' that has to percolate down through the line Ministries to districts and township authorities and then to local communities – who are the users of such information. Also very importantly, there are limited community level mechanisms and structures relative to disaster risk reduction and management in responses to impacts of extreme weather events including horizontal dissemination of hazard information and early warnings. The Department of Meteorology and Hydrology currently produces daily, weekly and seasonal weather forecasts, but they are not effectively used by farmers in changing their livelihood behaviors – for example, selecting different crop varieties at the sowing season, adjusting sowing or harvesting schedules, or obtaining extra forage in preparation for a projected dry spell or early arrival of monsoon. Such information is disseminated by DMH through public TV and radio, which precludes many poor farmers without access to such equipment from receiving it in the first place, and it is not disseminated in such a way that is tailored for agricultural purposes or understandable to farmers. The situation is similar for early warning information related to sudden onset of natural disasters. In recent two major disasters in the Rakhine State- landslides and flood in June 2010 and Giri cyclone in October 2010 affected the estimated numbers of 29,000 and 260,000 people respectively as early warning information on upcoming cyclone was disseminated only through TV and radio and hence never reached to people in rural villages. What ensued was the loss of human lives and livelihood assets. To deliver climate risk information in such a way to reduce exposure and/or increase resilience of coastal areas and to prevent loss of lives of farmers' and their livelihood assets to both slow and sudden onset of climate extremes, an effective integration of community-based networks into the existing dissemination channel is crucial. This is further compounded by the fact that there are currently no examples or technical know-how and lessons

learnt on what works and what does not when it comes to climate smart agricultural practices, climate adaptive practices for diverse livelihood options, and effective community based mangroves rehabilitation and afforestation practices including sustainable management regime of ‘special mangrove protected areas’ in the country.

Baseline Projects: The most relevant baseline set of activities are those that are led by the Forest Department (FD) under the management of Ministry of Environmental Conservation and Forestry. The FD is responsible for protection, and conservation of the wildlife and sustainable management of the forest resources in the country. As part of its reforestation activities it established around 2265 acre of mangrove afforestation and 205 acre of community woodlots in Rakhine State with the aim of protecting and reducing the losses of economic, social, lives and livelihood assets from natural disasters, managing and stabilizing the mangrove ecosystem and mangrove biodiversity, and taking into the lessons learnt from the past devastating disasters. Together with related activities of enforcement of forestry laws, monitoring illicit activities and engagement with local communities, this programme is supported by an annual budget of approximately 2 million USD. These plantations however have been established with limited knowledge of and integration of climate change impacts including choice of climate resilient species and adoption of appropriate planting and tending practices. A nationally relevant baseline is the establishment of a Protected Areas (PAs) network that will preserve natural ecosystems around the country to sustain the important ecosystem services that this important ecological infrastructure provide. In this regard, the Nature and Wildlife Conservation Division (NWCD) of the FD led the establishment of a network of protected areas in the country consisting of at least 43 PAs under the Protection of Wildlife and Protected Areas Law. This PA estate covers around 6 percent of the total area in the country. The NWCD has an annual budget of around USD 750,000.

In addition, UNDP’s baseline activities encompass a range of community sustainable natural resource management initiatives which are currently implemented as part of the Human Development Initiative (HDI) and which will be continued under the upcoming Country Programmes for 2013-2015 and 2016-2019. These initiatives include community-based reforestation and sustainable forest management, watershed management, development of community-based resource and land-use planning systems, sustainable agricultural and livelihood development Programme and local conservation Programmes. These Programmes currently average approximately \$30 million per year nationwide, and will increase to \$50 million per year under the upcoming Country Programme. Further, in November 2011, Myanmar became a UN-REDD Programme partner country and is working towards developing a national REDD+ readiness road map. A REDD readiness Programme is under development, for which approximately \$500,000 per year is being mobilized.

A very important partner initiative funded by the Livelihoods and Food Security Trust (LIFT) is the Coastal Livelihood and Environmental Assets Restoration in Rakhine (CLEARR) project implemented during the period 2012-14. The project has a budget of around USD 3 million and is focused on the mangrove forest conservation and sustainable utilization of mangrove resources in tandem with efforts to enhance livelihood and food security efforts in the State. Some of the important activities include promoting of improved practices of agriculture, livestock and fishery production while also ensuring greater participation and role of coastal communities. Though highly critical to addressing climate change impacts, this project has very limited attention paid to incorporating climate change adaptation measures and will benefit from integration of climate risks into measures aimed at improving livelihoods and mangrove rehabilitation. Likewise, the Ministry of Environmental Conservation and Forestry (MoECAF) implemented project in Rakhine area called “Sustainable Community-based Mangrove Management in Wunbaik Forest Reserve” was aimed at promoting conservation and rehabilitation of mangrove forest through participation of the coastal communities. The project implemented from 2009 to 2011 with a budget of around USD 340,000, generated important status information on the mangrove forest condition, socio economic condition of local communities, identification of tidal tree species and also lessons in developing an integrated mangrove management plan, and community based forest management. The community institutions and structures and the lessons are important entry points for the current project.

Another relevant project is the one that relates to the disaster risk reduction component of a project under the Ministry of Transport with the express aim to install radar in Kyaukphyu township in Rakhine State. The project is implemented with technical assistance and funding from Japan International Cooperation Agency (JICA). The project intends to set up, and improve capacities for forecasting weather and upgrading weather forecast system. The weather forecast transmitted from radar will protect coastal communities from extreme weather events. The estimated cost is around USD15 million USD. The proposed project will coordinate with this in particular in the design of the Early Warning System (EWS) and information dissemination component. Finally a local NGO called the Mangrove Service Network (MSN) has been implementing mangrove rehabilitation and livelihood support activities in Yanbye Township since 2010 and in Kyaukphyu Township since 2012. The project activities include fishery promotion, mangrove restoration, and support to land use classification in one of the reserved forests under the Forest Department. In Kyaukphyu Township, around 25,000 acres of unprotected forests that was converted into shrimp farming and salt farming in the past had been abandoned by the farmers as these lands were unsuitable for cropping by high salinity. MSN established more than 1,000 acres of the

community mangrove plantations in these abandoned areas. Moreover, MSN is supporting the improvement of fishery sector such as in conservation of aquatic animals, promoting measures to replenish stocks and adding after catch value such as through fish or shrimp processing units that are powered by renewable energy sources (solar energy). The total investment is around USD 1.2 million. In addition MSN is an important partner and can support in implementing community level activities.

Alternative scenario and Additional cost reasoning: The project aims to reduce the vulnerability of local communities in coastal areas of Rakhine State at risk from climate change and enhance the functionality and resilience of mangroves in this area to respond to the projected impacts on coastal communities from these projected climate change impacts. This region is prone to the highest frequency of cyclones accompanied with storm surges and sea water inundation that claimed many lives in the past and adversely affected on agriculture, fisheries and forest resources related livelihood activities thereby causing hardship to the lives of resident communities. The project will undertake activities to mainstream ecosystem based approaches (EBA) into national development policies, laws, and institutional functions, to implement landscape level coastal area management planning in selected areas of the coastal zone (at least one township) and introduce EBA as an integral component in the country's approach to climate change adaptation, thereby strengthening recognition of the importance of natural ecosystems for climate change risk management, as well as maintenance of socio-economic benefits and conservation of biodiversity. This project has three main components and their interlinked outcomes to achieve the targeted goal. Component 1 will address insufficient capacity of planning and implementation, institutional, legal and financial frameworks at local and national levels so that EBA approaches to climate change risks are well informed, coordinated, financed and supported by necessary laws and policies that results in climate change adaptation in coastal areas mainstreamed into local and national development planning frameworks. Linking with integrated coastal zone planning, vulnerability mapping and decision making tools developed under component 1, component 2 will focus on strengthening the adaptive capacity of coastal communities and improving the functionality and integrity of coastal ecosystem through improved connectivity, management and protection of mangrove forests and through the promotion of climate smart best practices in agriculture, fisheries and alternative sustainable livelihood improvements. The component 3 is designed to bridge the gap of connecting between new afforestation/reforestation programmes, climate resilient diversified livelihood practices and efforts aimed at increasing capacities for disaster preparedness and management in coastal areas and in this light supporting the delivery of seasonal weather information and extreme weather events through effective community level disaster risk management and early warning system. The following section discusses each component, expected outcomes and outputs in terms of the existing baseline and the expected alternative under the project implementation.

Component 1 - Climate change adaptation in coastal areas is mainstreamed into local and national development planning frameworks

Outcome 1. Reduced vulnerability across the coastal areas in Myanmar by safeguarding, improving and restoring ecosystem functionality and increased adaptive capacity of key stakeholders to effectively address climate change risk

Baseline:

Institutional capacity for planning and implementing adaptation approaches will remain insufficient at the national and local levels, with limited access to tools and information for internalizing climate change risks into land, water and coastal resource planning. Land use planning especially in coastal areas will largely be focused on physical infrastructure and agricultural / aquaculture promotion, with ecosystem functions critical for climate change adaptation ignored. Climate change will not be internalized in land use and resource management, increasing the likelihood of ecosystems being degraded to a point where they are no longer resilient to climate change. Adaptation actions will remain fragmented and uncoordinated. No systematic knowledge management system with adequate EBA elements will be developed and institutionalized, and up scaling of best practices will not happen. Financial resources for EBA approaches will remain limited and largely drawn where possible from more general funding for sustainable development and conservation. Since Myanmar ratified the Kyoto Protocol in August 2003, the government has taken concrete steps towards the implementation of the UNFCCC, such as implementing the First National Communication on Climate Change, and developing a National Climate Action plan in 2012 that addresses many aspects of coastal zone conservation, rehabilitation and mitigation. Myanmar has also drafted land use policy and adopted at least two new laws- the Vacant, Fallow and Virgin Lands Management Law (VFW Law) and the Farmland Law which set out the processes for management of the two overarching categories of land relevant to farmers: farmland, and Vacant Fallow and Virgin (VFW) land in 2012. However, specific laws and regulations to protect key ecosystem features in the coastal zone, such as mangroves (outside of protected areas) and sand/shell ridges, do not exist. In addition, although numerous public agencies have responsibilities for planning, resource management, and development in the coastal zone of Myanmar, few of these agencies have a clear idea of their obligations regarding the mitigation of and adaptation to climate change impacts.

Managers and Departmental staffs are poorly equipped to develop and implement informed approaches that fully integrate the interests of local communities with climate change adaptation goals and objectives owing to conflicting legal/policy directions. In addition, decision-makers at all levels have little idea of the economic costs of climate change, or the relevant costs of EBA approaches and other potential alternatives, which are necessary in order to make appropriate decisions on interventions required to protect Myanmar's coastal zone. Adaptation efforts to date have not incorporated EBA approaches, relying instead on the construction of physical infrastructure and protective structures. However, this has been recognized as a shortcoming and there is keen interest to develop concrete methodologies and actions for EBA approaches.

Alternative:

1.1 Decision making tools for planning, enforcement and management frameworks strengthened to ensure that infrastructure, productive/extractive activities and habitat clearance are not affecting strategic coastal ecosystems and communities to increased climate risk including:

- *Strategic risk assessment* of the cumulative impacts of climate risk and programmes of infrastructural or productive development in coastal areas to ensure that coastal area permitting and zoning prevent mangrove degradation or habitat change;
- *Integration of EBA measures* into planned work promoting engineering and physical protective structures to enhance effectiveness and reduce costs
- *Vulnerability mapping and generation of GIS based information* (e.g. biological importance, fragility and productive potential of target areas) as supports to planning climate related decision-making at township, provincial and national levels;
- *Integrated Coastal area management plans (1) that define no-go areas for development, delineate areas for different sectors; SEA made mandatory for expansion of economic areas (e.g. SEZs in the future)*

1.2 Sectoral guidance and regulations issued to strengthen the control and prevention of climate impact in vulnerable coastal areas:

- *Proscriptions and recommended practices for key sectors* (e.g. agriculture, fishery, livestock, tourism) to address climate change adaptation concerns
- *Regulations and governance arrangements for mangrove forest management¹⁶* to protect mangrove forests, establishment and protection of buffer areas, zoning, establishing setbacks through community involvement

1.3 Key stakeholder are better able to identify, manage and monitor climate risks to coastal areas including:

- *Cross-sectoral institutional platform* for oversight of planning, funding, implementation, monitoring and enforcement of coastal adaptation plans
- *Training programme for staff* of key government agencies, NGOs related to risks of climate change on coastlines and ecosystem based adaptation and *targeted training* for local communities on integrated coastal area management, mangrove plantation techniques and management
- *Appropriate participation mechanisms* for local people to participate in the design, implementation and monitoring of adaptive measures and risk mitigation for the conservation and sustainable use of the mangroves
- *Information sharing platform* set up to share climate related agro-meteorological advice to coastal farmers including lessons learnt.

LDCF funding will be used to establish changes to the institutional, legal, planning and financial frameworks so that EBA approaches to climate change risks are well informed, coordinated, financed and supported by necessary laws and policies. To further support planning and decision making, the proposed alternative will focus, for the first time in Myanmar, on the integration of EBA approaches at four township field sites into existing regional (Coastal Action Plans; regional zoning plans; management plans for Multiple Use Management Areas) and national plans (Integrated Coastal Zone Management Plan), as well as Environmental Impact Assessment processes, with the goals of ensuring that existing spatial and development planning does not degrade existing ecosystem services, and that decisions related to construction of coastal protection structures, including siting and design, take account of ecosystem services / functions as they relate to climate change resilience. Detailed comparisons of the economic costs of climate change impacts, the economic value of ecosystem services for climate resilience, and the costs and benefits of different EBA approaches, will provide consolidated information on costs and benefits of Ecosystem-Based Adaptation approaches to climate change impacts, and thus the framework upon which to justify and structure new financing mechanisms and budget allocations to support EBA approaches nationally. Furthermore, these approaches will be based on technical analyses of their suitability under the varying conditions found in the coastal zone of Myanmar in addition to strategic environmental and vulnerability assessments of ecosystem functions, climate change related threats, and resilience to those threats for all of the project

¹⁶ The government has expressed keen need for a mangrove governance framework for the coastal areas in the country

sites where EBA approaches are to be implemented under Component 2, which will increase the capacities of resource managers to understand, identify and assess EBA information, and to consolidate information resources / data from various national institutions and district offices and agencies, as well as from different thematic sectors (e.g. coastal management/planning; biodiversity conservation; water resources management; etc.).

To further support institutional coordination, an information sharing platform between government ministries (as well as district and township administrators and staffs) with responsibility for issues related to climate change and coastal zone management will be established, allowing these stakeholders to share technical information and data; information on developing projects and policies; etc. In terms of financing, both increased budget support from the government and new financing mechanisms (e.g. a Trust Fund; agreements for offset payments, etc.) will be explored in order to support cost-effective EBA approaches to protection from coastal climate change impacts over the long-term. Changes to key laws and regulations also will be pursued, such as ensuring that mangroves are protected species under the Forest Law and that mangrove “special protected forests” can be established; that buffer zones can be established under the Law on the Issuance of State Owned Lands; and regulations are in place to restrict harmful activities in coastal areas, so as to ensure that ecosystem capacity to provide resilience to climate change impacts is not diminished. Finally, to generate support for these institutional, policy and legal/regulatory changes, the project will develop and implement awareness raising and non-technical information sharing programs on the value of mangrove ecosystems, climate change threats to Myanmar, and potential benefits of EBA approaches for the general public and targeted groups of stakeholders (including materials targeting the poorest communities). Public awareness campaigns will develop and disseminate publications, brochures, TV spots, radio announcements, etc. covering these thematic areas (awareness materials will co-developed with other initiatives such as the Adaptation Fund funded UNDP project “Addressing Climate Change Risks On Water Resources And Food Security In The Dry Zone Of Myanmar”). In addition, technical information materials will be disseminated to national level policymakers, in particular communicating the results of studies on the economic valuations of mangrove / wetland ecosystems and on the potential economic impacts of climate change, and to explain their potential role in EBA approaches.

Component 2 - Enhanced ecosystem integrity and functionality providing coastal protection and water / flood management services

Outcome 2. The climate resilience of targeted vulnerable coastal sites that support community livelihoods and provides important coastal protection is strengthened by focusing on vulnerable natural and social assets

Baseline:

The coastal zone of Myanmar, which covers about 12% of the country’s total area and harbours approximately 85% of its population, is the most vulnerable area of the country to projected climate change impacts. Coastal and river flooding, severe erosion, and saltwater intrusion already constitute a regular threat to significant areas of infrastructure and agricultural production. In selected areas, mangroves will be protected for their biodiversity values, but as is the case in the past, not specifically to protect the shoreline from erosion and flooding. In areas outside protected areas the degradation of mangroves will likely continue. There are no examples of EBA approaches to climate change to guide decision-makers, and decisions on the fundamental approach that the country must take to improve coastal protection (balancing hard coastal protection structures and EBA approaches such as mangrove conservation/restoration) cannot be based on firm data or demonstrated experiences. In addition, there is no coastal monitoring system in place that helps to track and explain the linkages between weather events and coastal processes, and how these are evolving in the face of climate change and its variability. As a consequence, resource managers and scientists in Myanmar are unable to inform decision-makers on the most cost-effective coastal adaptation measures that should be integrated into all future coastal zone development plan. In this scenario, there will continue to be significant coastal and riverbank erosion, flooding and saltwater intrusion, causing the destruction of housing, roads and other infrastructure and the abandonment of agricultural lands and even entire coastal communities. There is little awareness or understanding of the implications of climate change in the coastal zone: households, communities, and Government institutions do not factor possible climate change impacts into their plans and activities that would be impacted by rising sea level and more frequent storm surges. At present, there are no projects or activities that provide local communities with the ability to implement EBA interventions on a meaningful scale, and resilience diminishing activities will continue unabated across ecosystems. No model is available to show communities how to build the capacities necessary to benefit from consolidated efforts to develop and implement national and international best EBA practices. In this scenario, without understanding of how climate change and human activity may interact to impact the coastal zone, and without knowledge or tools for a range of EBA approaches and how they can be implemented in a practical, cost-effective manner to address climate change impacts, development activities will carry on as usual and buildings and infrastructure will suffer increasing risks from sea level rise and increased frequency of storm surges, with significant costs accumulating and being re-directed away from other essential social

services. Furthermore, local communities in areas along the immediate coast will see the loss of livelihoods as agricultural lands become inundated and mangrove destruction impacts fisheries, and in some cases local inhabitants will be forced to relocate inland in the face of increased flooding, erosion and saltwater intrusion.

Alternative:

2.1 Strengthened resilience of mangrove ecosystem in 4 townships (Kyauk Phyu, Yanbye, Myay Bone, Mann Aung) as follows:

- *Improved connectivity of critical mangrove ecosystems* through 1280 ha of newly established mangrove area
- *Improved protection of mangrove area (1200 ha)* declared as community mangrove conservation area
- *Improved management of (305 ha) of buffer zones* including establishing trial plantations (61 ha) to enable selection and use of climate resilient mangrove varieties and plantation techniques

2.2 Climate resilient agriculture practices and sustainable alternative livelihoods promoted including:

- *Climate resilient crops and agronomic practices* promoted to reduce crop failures (e.g. saline resilient rice varieties, crop rotations)
- *Alternative livelihoods* that diversify farm income and reduce risks (e.g. integrated fish, fruit and forest farming, improved livestock rearing)

The proposed alternative for the project field sites involves design and implementation of site-specific technical interventions to conserve and enhance ecosystem functionality and resilience to climate change impacts at these sites, with significant resources allocated to ensuring that mangrove ecosystem functionality is conserved through protection of existing mangroves as well as through restoration of mangroves, given the importance of intact and healthy mangrove ecosystems in buffering coastal settlements and limiting the impacts of floods, storm hazards, and saltwater intrusion. Interventions at all project field sites will include spatial zoning / planning, and the establishment of special protected mangrove forests. Site interventions will include mangrove afforestation, the restoration and conservation of sand / shell ridges, and implementation of natural / cultural heritage tourism activities. Other interventions will include sustainable alternative agro-based practices (apiculture; non-timber forest products; local handicrafts; nature tourism).

The establishment of buffer zones behind coastal and riverine mangroves in Myanmar is critical to ensuring mangrove ecosystem functionality and resilience to climate change impacts, as well as the maintenance of coastal features that mitigate the impacts of coastal flooding, erosion and saltwater intrusion. As mentioned previously, freshwater flows are critical to the health and functionality of coastal mangroves, and extensive development (roads, buildings, water control structures) in the areas immediately behind these mangroves can severely impede these flows. Furthermore, coastal mangroves must have an area on their inland side where they can migrate when mud banks are not present. In this regard, several comprehensive studies of the coastal zone elsewhere have proposed buffer zone areas extending for 2-4 km. behind coastal mangroves; the project will work to establish such boundaries. At sites selected for the implementation of project field activities, the project will undertake a variety of buffer zone management actions, designed to enable and strengthen EBA approaches to climate change impacts. Work undertaken in buffer zones (e.g. restoration of sand/shell ridges; water system management, including clearance and maintenance of canals, creation of culverts/sluices, etc.) will be labor intensive, and the vast majority of this work will be carried out by local organizations / inhabitants contracted by the project and trained in relevant skills and practices.

The project also will establish a long-term program for monitoring of the activities carried out at the project field sites, including monitoring of key ecosystem functions and conditions, such as: extent and health of mangroves and wetlands; hydrological and geomorphological conditions; coastal erosion rates and movement of mud banks; saltwater intrusion events; coastal flooding events; etc. Reporting of data, analysis, and interpretation will be made available to all coastal practitioners, and will be used to inform technical design of EBA approaches to climate change risks. The monitoring system will also support enforcement of regulations / restrictions protecting key ecosystems and their functions, including: coastal and riverine mangroves; wetlands; shell/sand ridges; inland swamp areas (critical to coastal area hydrological processes). The project also will work with the National and Regional Disaster Preparedness Central Committee (NDPCC) to explore options for adapting the on-going development of seasonal weather variability, extreme weather events and the early warning system for coastal flooding to measure and report on data apart from water levels (e.g. contamination; sedimentation). The project will engage in active outreach to and engagement of local communities through climate change awareness raising and information exchange activities and participation in EBA approaches to climate change impacts. As result, vulnerable communities will be able to make informed decisions in regards to potential impacts (floods, saltwater intrusions, storm damage) and undertake coordinated responsive measures when necessary. In addition, handbooks and other materials will be produced to codify lessons learned on EBA approaches. The project will disseminate the best coastal adaptation practices to all coastal stakeholders, practitioners, and decision-makers through

public awareness campaigns at local (site) and national levels, with special emphasis on local communities and others in fisheries, agriculture and tourism sectors, through publications, TV spots, radio announcements, signage; brochures, etc.

In addition, information workshops and materials will be directed at national level policymakers on the economic valuations of mangrove / wetland ecosystems and economic impacts of climate change, and at national level institutions to improve coordination and to adopt EBA approaches. This disseminated awareness and understanding of climate change and coastal processes, and the need for adaptation measures will reinforce local support for and compliance with EBA policies, regulations, and technical approaches. Furthermore, these communities will see direct benefits through improved conditions and employment opportunities in the implementation of EBA activities, which will increase local support for using decentralized, district level funds and resources to continue EBA activities over the long-term. Local communities will be directly employed in the establishment and operation of mangrove nurseries; planting and irrigation of mangrove seedlings; monitoring of mangrove forest development and health; and the maintenance and improvement of hydrological systems (canals, culverts, etc.). In addition, local farmers will benefit from training in alternative agricultural practices to reduce water consumption and contamination from agricultural chemicals, and local inhabitants in general will gain from opportunities to operate small businesses for nature tourism (e.g. bird watching). Investment in this component represents a unique opportunity to assist local stakeholders to move economic development and poverty alleviation forward while conserving the ecosystem functionality upon which this development depends. Finally, the facilitation of exchange visits between project sites will allow communities to learn from each other's experience on-site in a practical way. LDCF resources will also support the sharing of experiences more broadly at the national and whereby appropriate at the regional and global levels through presentations at regional events.

Component 3 –Disaster risk mitigation and preparedness strengthened through effective weather and early warning information outreach to vulnerable communities

Outcome 3. Coastal mangrove ecosystems, communal livelihoods and lives are protected from extreme climate events

Baseline:

At present, there is no systematic connection between new afforestation/reforestation programmes, climate resilient agriculture and diversified livelihood activities in coastal and hilly areas and the delivery of weather information and early warning services. New plantations remain vulnerable and exposed to extreme weather events (cyclones, swell waves, inundations, landslides) and a number of critical livelihood assets (such as freshwater supply and storage systems, community shelters, fishing boats, agricultural fields and livestock sheds) keep suffering catastrophic losses from extreme events. Afforestation and reforestation programmes can provide an innovative outreach mechanism to connect exposed local communities to disaster early warning systems and provide complementary support mechanisms that reduce risks from extreme climate events (e.g. through the flood-proofing of communal infrastructure; establishment of flood-proof agriculture plots; safe havens for livestock; and contingency protocols in times of extreme weather). As for baseline, under the UNDP Country Programme Action Plan (2013-2015) signed with the Government of Myanmar in April 2013 where disaster resilience is one of the output areas with Relief and Resettlement Department and Department of Meteorology and Hydrology as the implementing partners, is in a superior position to promote disaster risk reduction. Update, Multi-hazard Risk Assessments conducted in 17 townships in Rakhine state will be used to further develop risk assessment profile of townships including the proposed targeted townships where risk assessment guidelines and manuals support from UNDP will be incorporated into township level risk assessment and development plan; then upscale to the State level. On the basis of 1034 villages that have been trained in Community Based Disaster Risk Management (CBDRM) plans in the most hazard prone areas of Myanmar during 2008-2012 by UNDP, CBDRM plans linking with seasonal weather information and extreme weather events to reach to the vulnerabilities communities and villages at risk in Rakhine State will be further developed. In addition, in collaboration with Ministry of Social Welfare, Relief, and Resettlement, UNDP's support on formulating and updating on Myanmar DRR Action Plan, Standing Order on Natural Disaster Management (2009) and Disaster Management Law (2013) will be utilized to identify gaps and obstacles on the path toward combining preparedness and mitigation efforts to create resilient development in Rakhine State since recommended actions, approach to enlist local governments and communities in DRR will be extracted and referred to in the aspect of DRR discussions and policy planning to have interconnected disaster mitigation action plan among local, regional and State level stakeholders.

Alternative:

3.1 Effective community level disaster management and early warning system including:

- *Locally appropriate systems to disseminate information* (e.g. chatty beetle SMS service, community radio establishment, radio transceiver set-up) including agro-meteorological, early warning information to vulnerable stakeholders including communities initiated

- *Appropriate community level disaster preparedness and management structures* set up in 4 coastal townships (e.g. CBDRM Committees) and linked to the well trained existing DRR youth volunteer network in Rakhine

3.2 Knowledge management mechanism in place:

- *Documentation of lessons learnt and best practices* (on mangrove forestation and management, community based adaptation practices including also effective use of indigenous indicators for monitoring climate risks) are generated and disseminated widely through appropriate mechanisms

LDCF fund will be used to build the UNDP-supported programme as a delivery platform so that the project will ensure that all communities who are engaged in afforestation and reforestation actions under the proposed project are systematically connected to disaster early warning systems (including systems that transport warning signals through cellular phone, radio and volunteer outreach). A dedicated suite of community based support measures will be dedicated to the flood-proofing of agricultural plots and community infrastructure (such as communal ponds and reservoirs, freshwater tanks, hand pumps). The proposed project will ensure that Disaster Risk Reduction and Climate Change Adaptation can be coupled into an integrated risk reduction approach that is comprehensive and includes both disaster risk reduction measures that provide both short-term protection from intensive risk (through sharing of early warning information; agro-meteorological information), as well as long-term protection from extensive risk (community level disaster management structures that also engage in and consider long term risk reduction measures such as building ecological defense infrastructure (mangroves) and increasing local community coping / adaptive capacity (through improved livelihood sources, income and collective capacities).

Adaptation Benefits: In Myanmar, a large portion of the country's population and infrastructure are located on the low-lying coastal plains. This exposes significant portion of the national population to severe impacts of climate change. The proposed LDCF project will focus on the maintenance and restoration of essential ecosystem functions in the coastal zone, with the goal of reducing climate change induced flooding, erosion and saltwater intrusion through ecosystem based adaptation measures. By increasing the capacity of Myanmar's coastal communities to adapt to climate change, the project will reduce the need for investment in immensely costly structural solutions (seawalls and dikes) and/or relocation away from the most vulnerable coastal areas. As a result, government funds can be directed towards social welfare and human development priorities, thereby generating significant national benefits. In addition, if projections for sea level rise and increased storm intensity become reality, more and more of the coastal zone of Myanmar will require some combination of coastal protection structures and EBA approaches in the coming decades. Therefore, by providing models for the design and construction of future coastal protection infrastructure, the approaches developed in the project will provide benefits to the entire country.

The primary direct beneficiaries are the inhabitants of the most vulnerable coastal landscapes in the 4 townships targeted by the project: Kyaukphyu, Yanbye, Myaybone, and Mann Aung. These townships have a combined population of approx. more than 100 thousand persons. A number of factors (high frequency of cyclones, topography; coastal bathymetry; wind/wave orientation; development activities; etc.) make some areas of these 4 townships much more vulnerable than others to climate change impacts. Furthermore, the project is only implementing on-the-ground EBA measures at sites with appropriate conditions (presence of coastal mud banks; potential for successful mangrove restoration / conservation; potential for successful hydrological management actions; local community support; and vulnerable local communities). However, it is expected that the direct beneficiaries in the targeted areas will be persons who reside primarily areas along the immediate coast and specific areas of sea and riverbanks. For the most part, the farmers, fishermen and other inhabitants of these communities are poor and particularly vulnerable to the loss of livelihoods from recurring flooding, saltwater intrusion on agricultural lands, destruction of mangroves and other fisheries habitat, and other climate change impacts. These communities will benefit not only from reduction of climate change impacts, but also from the additional investments in natural and productive capital through the project (such as improved water supply for fields prone to drought; reduced soil erosion; watershed protection; and conservation of habitat critical for fisheries). In addition, local inhabitants, in particular in poor communities, will benefit from opportunities for employment in the mangrove restoration and hydrological systems management components of the project. The most vulnerable segment of the coastal population also are likely to benefit the most from coastal protection activities, as it is these groups who normally are the most vulnerable to coastal flooding because the structures they live in are less resistant to flooding (e.g. less sturdy construction; lack of elevation off of the ground) and because they are more likely to stay in vulnerable areas due to lack of options. With the reduction of coastal flooding through the implementation of this project, these members of the community will be safeguarded.

2. Stakeholders.

Detail institutional arrangement of the project will be determined during the PPG in consultation with key stakeholders:

Stakeholder	Roles and responsibilities
National Environment Conservation Committee (NECC),	The National Environment Conservation Committee (NECC), formerly known as the National Commission for Environmental Affairs (NCEA), plays a key role in addressing environment-related concerns in the country, with the Secretary serving as Myanmar's Focal Point to the UNFCCC. The project will benefit from the strategic advice and directions from this committee.
Ministry of Environmental Conservation and Forestry (MOECAF)	MOECAF is responsible for assessing and mitigating the environmental impact of national development projects. MOECAF, as the UNDP Implementing Partner for the proposed project, has during the course of preparing this PIF consulted with a number of stakeholders. Under MoECAF, the Forest Department (FD) is a key stakeholder at the township and village level, while the Environmental Conservation Department (ECD) will provide technical backstopping and assistance on policy matters.
Department of Meteorology and Hydrology (DMH)	The roles of the DMH under the guidance of Ministry of Transport is to observe and analyze Meteorological & Hydrological data and to monitor changing climatic conditions. The DMH will issue warning and weather forecasts. The project's early warning system activities will be closely coordinated with DMH.
State Government	Four townships under the management of State authority are included in the project viz. Kyaukphyu, Myaybone, Yanbye and Mann Aung. The project will work with and coordinate its activities with the township administration bodies including the Township Administrator, the relevant township offices (for Forestry, Livestock, Fisheries, Agriculture, Planning etc.).
Department of Agriculture (DoA), Ministry of Agriculture and Irrigation	The main functions of the Department of Agriculture is to lead on agricultural research and extension developments aiming at increased production of major crops, improved production technology, crop management and pest control, development of suitable high yielding crop varieties, and distribution of certified seeds through seed programs among others. Agricultural related interventions including choice of crop varieties of the project will benefit from advice from the DoA.
Department of Fisheries and Livestock Breeding and Veterinary Department	Livestock Breeding and Veterinary Department and Fisheries Department under the Ministry of Livestock Breeding, Fisheries and Rural Development are responsible to formulate and implement strategies and plans to promote the livestock and fisheries sector in the county. These two Departments will be important stateholders and the project will liase with these two departments on promotion of fish/shrimp farming and other livestock related interventions.
Relief and Resettlement Department (RRD)	RRD under the Ministry of Social Welfare, Relief and Resettlement coordinates efforts of the Government, UN agencies, International Non- Governmental Organizations, Local Non-Governmental Organizations and Social Organizations for disaster prevention, preparedness and disaster risk reduction measures. Further, RRD leads in providing emergency response services and assisting the disaster victims, provision of assistance to the populations who suffer from famine as a consequence of damage of crops due to extreme weather events or insect infections or climate change impacts. RRD is an important stakeholder.
National Disaster Preparedness Central Committee (NDPCC) and Rakhine State Disaster Preparedness Committee	The National Disaster Preparedness Central Committee (NDPCC) was established in 2005, and reconstituted in 2013 to prevent/mitigate the loss of human lives, settlement and property to disaster events. In accordance with guidance of the NDPCC, Government departments prepare Disaster Management Plans. The NDPCC is an important stakeholder particularly at the national level in terms of policy guidance and advice on disaster preparedness and prevention.
Planning Department under the Ministry of National Planning and Economic Development	The Ministry of National Planning and Economic Development is responsible for national economic and development planning, as well as development of strategies and policies in determining financial allocations for the various sectors of the national economy. The Department of Planning under this Ministry coordinates efforts of different sectors and will also co-lead with the MOECAF, the component on mainstreaming CCA and in particular EBA into national and sub-national level development planning.
Local communities	Key beneficiaries of the project and primary user of the coastal mangrove ecosystem. They are the most impacted parties of climate change impacts while they also have a major role to play in mangrove ecosystem restoration and conservation. Critical participants of the project at the local level.

3. Gender Considerations.

Even though Myanmar culture generally does not manifest as discrimination **between man and woman**, certain areas of inequality and inequity have to be considered (e.g. access to economic resources, participation in household decision making and voice in rural development activities). UNDP Myanmar delivered assistance through Human Development Initiative (HDI) to meet basic social and food security needs of communities where women empowerment and their active participation was promoted in 62 townships in 11 regions. Along with these lessons and best practices, the proposed project will fully take into account the gender sensitivity in every stage of project design, planning, implementation, monitoring and evaluation processes which enable effective integration of women's participation, voices and views

including vulnerable and marginalized groups. Performance and inputs from women will be incorporated into all activities such as vulnerability and risk assessments so that these benefit women and men equitably for instance in terms of: economic resources, access to and control over natural resources and increased adaptive capacity against climate change induced threats. Generally, 50% of the targeted beneficiaries will be set for female in formation of CBOs and user groups and in tackling climate change adaptation measures through EBA approach including mangrove restoration, access to arable land, small scale water irrigation scheme and harvesting management, suitable species selection for agricultural crops and livestock, homestead garden and agro-silvo-fisheries establishment among others.

4 Risks.

Description	Level	Mitigation Measure
Climate change impacts (sea level rise; severe storm events) accelerate and coastal degradation occurs more quickly than expected, so that selected sites for coastal protection measures are no longer suitable for project interventions	Low	Selection of specific sites for mangrove afforestation / reforestation will be based on data and analyses from extensive studies of the Myanmar's coastline. In addition, climate change models and forecasts including those under the UNFCCC regional reporting and National Reports will be used to assess potential climate change modelling variances and thereby allow safety margins to be incorporated into the selection of sites.
Weak institutional support and political commitments to undertake the proposed project	Medium	The proposed project is strongly supported by Ministry of Environmental Conservation and Forestry as well as Department of Meteorology and Hydrology, other key stakeholders and development partners. The project will also seek the inclusion of all stakeholders including Union and Regional level Ministers and Governors to build the linkages with all existing and planned projects baseline development activities implemented by Government and Bilateral agreement securing the necessary co financing, at the same time the local buy in will minimize the risks.
Adaptation measures increase inequity in communities	Medium	Local level implementation through farmer groups, CBOs and NGOs will ensure that adaptation measures are demonstrated on the basis of participative processes which are gender-sensitive and enable participation of, and expression of views from, vulnerable and marginalized groups. Furthermore, during the inception phase of the project, M&E Officer will formulate a detailed beneficiary selection criteria and have it endorsed by relevant stakeholders to reduce the potential risks of wrong targeting

5. Coordination.

The project will facilitate learning from experiences and good practices from GEF funded and other initiatives in the country as follows. The GEF-FAO project "*Sustainable Cropland and Forest Management in Priority Agro-ecosystems of Myanmar*" will implement measures to promote sustainable agricultural and forestry practices. The project will strength legal, regulatory and institutional framework for sustainable forest and cropland management, develop and implement improved climate smart agriculture practices and upscale best practices and successful models in sustainable cropland and forest management in different agro-ecosystem of Myanmar. The current project will coordinate with this project in terms of establishing climate resilience community-based mangrove reforestation and conservation activities, sharing knowledge and best practices of successful climate smart agricultural practices. Similarly, UNEP together with the MoECAF and Ministry is implementing the project "*Adapting Community Forestry Landscapes and Associated Community Livelihoods to a Changing Climate, in particular an increase in the frequency and intensity of extreme weather events*". The project will assess and promote appropriate climate-resilient community approaches and technologies to promote community forestry together with integrated farming and other improved practices. The current project will benefit from this project especially in designing models of integrated farming technologies such as agro-silvo-fishery technologies. In addition, the current project will complement efforts under the GEF-UNEP project in establishing and improving effectiveness of early warning systems in the region. The Ministry of Livestock and Fisheries (MoLF) is implementing the GEF-FAO project entitled "*FishAdapt: Strengthening the Adaptive Capacity and Resilience of Fisheries and Aquaculture-dependent Livelihoods in Myanmar*". This project will ensure that the fishery sector in Myanmar is climate resilient with a focus on food security and fish replenishment in order to improve livelihoods fishermen. It will promote sustainable fishery management to mitigate the impacts climatic change. The current project will benefit from the GEF-FAO project by picking up and integrating lessons on community-based fishery resources management especially in the design and implementation of aimed at improving livelihoods of coastal communities.

Finally the proposed project is well coordinated with and builds on important baseline initiatives in the country, including those that are led by the Forest Department (FD) concerned with the protection, conservation and sustainable management of forest resources including mangrove reforestation in Rakhine State, the on-going activities to promote community-based reforestation and sustainable forest management under the UNDP led Human Development Initiative (HDI) programme and also other baseline projects operating within the Rakhine State and that are directly relevant, such as the LIFT funded “Coastal Livelihood and Environmental Assets Restoration in Rakhine (CLEARR)”.

6. Consistency with National Priorities.

This proposal addresses more than one priority identified in the NAPA which was prepared with the full involvement of all relevant stakeholders. Myanmar’s NAPA prioritize 32 urgent and immediate priority adaptation projects to effectively address climate change effects in eight sectors. Of these, developing early warning system, agriculture and forestry sector envisaged in this project proposal are in line with NAPA’s first priority level sectors. Further, the proposed project is fully supportive of achieving the National Sustainable Development Strategies (NSDS) by alignment with the goals of NSDS and Government’s 8 prioritized strategic activities which includes environmental conservation and increased agricultural production sectors for rural development and poverty alleviation. The project also contributes to the achievement of Millennium Development Goals (1, 3, and 7). This is important given that a large portion of the country’s population relies on climate sensitive natural resources. Furthermore, through its intervention focusing on enhancing food security in the project area, the project will also directly contribute to the proposed Sustainable Development “Goal 2: End hunger, achieve food security and improved nutrition, and promote sustainable agriculture”.

7. Knowledge Management.

Knowledge management will be pursued as an integral strategy of the project for making the case to Rakhine State and national government for ecosystem-based approaches to be viewed as an important element national and local climate change adaptation strategies and also how it differs from and complements other climate change adaptation strategies. In doing so, the project will document lessons from developing decision-making systems that guide EBA related frameworks and guidelines and how these are adopted or the challenges faced in promoting these policy instruments. Similarly, the project will proactively document the process of identifying, selecting, implementing and monitoring site-level adaptation measures including those promoted in agriculture and livelihood sectors. A primary purpose of knowledge management function will be to share learnings between different stakeholders in the country engaged in similar activities and will involve developing regular reports on evidence based results and lessons learned in each target townships that demonstrate the benefits of EBA approach; and presenting and sharing these results at different fora and formats – at State and national levels and in different formats such as lessons and best practice documentation, extension materials, discussion papers etc.


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

A. RECORD OF ENDORSEMENT¹⁷ OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S):

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
Hla Maung Thein	Director General / GEF OFP	Ministry Of Environmental Conservation and Forestry (MoECAF)	04/28/2015

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF policies¹⁸ and procedures and meets the GEF criteria for project identification and preparation under GEF-6.

Agency Coordinator, Agency name	Signature	Date (MM/dd/yyyy)	Project Contact Person	Telephone	Email
Adriana Dinu UNDP – GEF Executive Coordinator		16/02/2015	Mr. Doley Tshering	+66 (0)2 304 9100	doley.tshering@undp.org

¹⁷ For regional and/or global projects in which participating countries are identified, OFP endorsement letters from these countries are required even though there may not be a STAR allocation associated with the project.

¹⁸ GEF policies encompass all managed trust funds, namely: GEFTF, LDCF, and SCCF