



Project Document

**SECTION 1: PROJECT IDENTIFICATION**

1.1	Project title:	Adapting coastal zone management to climate change considering ecosystem and livelihoods	
1.2	Project number:	PMS: 548	
1.3	Project type:	FSP	
1.4	Trust Fund:	LDCF	
1.5	Strategic objectives:	Climate Change Adaptation	
	Strategic programme for GEF IV:	Climate Change Adaptation	
1.6	UNEP priority:	Climate change Adaptation	
1.7	Geographical scope:	National	
1.8	Mode of execution:	External	
1.9	Project executing organization:	Ministry of Environment and Forests	
1.10	Duration of project:	60 months	
		Commencing:	01-08-2014
		Completion:	30-08-2019
1.11	Validity of project		
	Cost of project	US	%
	Cost to the LCDF	5,337,500	31%
	Co financing	12,050,000	69%
<b>Grant</b>			
	Ministry of Environment and Forests	3,380,000	19%
	Ministry of Agriculture	5,000,000	29%
	UNEP	1,000,000	6%
	Sub total	9,380,000	54%
<b>In kind</b>			
	Ministry of Environment and Forest	2,170,000	12%
	Ministry of Agriculture	500,000	3%

## **Project summary**

Madagascar is a low income country with a national economy depending essentially on natural resource based sectors including agriculture, mineral extraction, tourism, and fishing/aquaculture. The 2012 Human Development Report of the United Nations Development Programme ranked Madagascar as one of the lowest developed countries coming in at 151 out of a total of 187 countries. The UN has estimated that 71% of Malagasy population are living below the poverty line with the highest rates of poverty found in the coastal regions of the east and south. Rapid population growth (2.8% annually) and rapid urbanization (4% annually) puts pressure on natural resources especially with regard to the coastal zone - as a majority of the population rely heavily on rain fed agriculture and coastline resources. The degrading effects of increasing human activity in the coastal zone are exacerbated by current climatic variability, principally sea level rise of 0.2m, warming, and increased frequency in extreme weather-induced events such as tropical storms, floods and droughts.

Climate characteristics in Madagascar have changed and will continue to change. In the past five decades there is clear evidence that temperatures have increased with a mean annual temperature of 2.5°C to 3°C, following the global trend. In addition, annual rainfall is projected to decrease, with a marked reduction during the dry season (April and May), and intensely increase during the rainy season (December to February). Moreover, during the past three decades, Madagascar appears to have been affected by frequent occurrence of disastrous climate linked hazards such as tropical storms - there is an increase in frequency and intensity in the Southern Indian Ocean (10 to 20% more intense). These changes are likely to adversely affect natural ecosystems, agriculture and community livelihoods throughout the country, especially in the coastal zones which have been identified by the National Adaptation Plan of Action (NAPA) as being one of most vulnerable areas of the country to climate change.

In addition, national structures, including communities, local leaders, researchers and government agencies currently lack the capacity to plan for, overcome and withstand the current and anticipated climate change-related threats. This capacity deficit as well as underlying vulnerability to climate change impacts are exacerbated by the following non-climate change-driven causes: i) unsustainable use and management of natural resources; ii) high poverty levels; iii) high population density and rapid urbanization; iv) dependence on rain-fed agriculture and coastal resources; and v) inadequate policy and legislation to address climate change issues.

LDCF resources will be used to address the vulnerability of coastal zone of Madagascar to current and expected climate change and the lack of capacity to cope with it. The LDCF project will create adaptive capacity among all social groups, whether government or communities, from the local to the central administration level, while ensuring that the local environment can be protected and managed in a way that allows it to withstand climate change impacts and to provide continued livelihoods. This will include demonstration interventions at pilot sites in four coastal regions – Menabe, Boeny, Antsinanana, and Vatovavy Fitovinany to restore, protect and sustainably manage productive ecosystems, as well as invest in the restoration of coastal barriers and buffers such as sea walls and dykes.

The proposed project implements NAPA priorities 1, 6, 7 and 3 as they pertain to the coastal zone, which is identified in the NAPA as a priority area for adaptation action. Project interventions will

consist of: i) a strengthening of scientific and technical capacity towards adaptation in coastal zones; ii) the implementation of key adaptive measures and technologies in vulnerable sites iii) and the creation of an enabling policy environment towards stronger coastal resilience.

This will be realised through the achievement of the following outcomes:

1. Strengthened institutional capacity to address climate change impacts in project sites (Menabe, Boeny, Vatovavy Fitovinany and Atsinanana)
2. Restored and protected coastal zones
3. Climate change adaptation measures are mainstreamed into national and sectoral development strategies, and in non-state stakeholder actions.

This project builds on a baseline of ongoing development programming supported by the Malagasy Government (and its partners), which address the above underlined baseline issues, including in particular in sectors such as Environment, Agriculture, Water and Infrastructure, in and around the four targeted regions. The LDCF project will be implemented by UNEP, and executed by the Ministry of Environment and Forests of Madagascar.

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## Acronyms

CCA	Climate Change Assessment
ICZM	Integrated Coastal Zone Management
LDCF	Least Developed Country Fund
MAP	Madagascar Action Plan
MEF	Ministry of Environment and Forests
NAPA	National Adaptation Program of Action
NEAP	National Environment Action Plan
ONE	Office national de l'environnement
PPRR	Rural Income Promotion Programme
PRDR(RRDP)	Regional Rural Development Plan
PROSPERER	Programme de soutien aux pôles de micro-entreprises rurales et aux économies régionales
PRSP	Poverty Reduction Strategy Paper
RICZM	Regional ICZM committee
SAHA/MATROY	Support Programme for Rural Development
UNEP	United Nations Environment Program
VIA	Vulnerability Impact Assessment
VA	Vulnerability Assessment
WIOMER	West Indian Ocean Marine Ecoregion
VRA	Vulnerability Risk Assessment

## SECTION 2: BACKGROUND AND SITUATION ANALYSIS (BASELINE COURSE OF ACTION)

### 2.1 BACKGROUND AND CONTEXT

1. Madagascar is a low income country with a national economy depending essentially on natural resource based sectors including agriculture, mineral extraction, tourism, and fishing/aquaculture. The country is renowned for its highly endemic biological diversity, rich forests and a wealth of natural resources. However, the country is also plagued by environmental degradation, low agricultural productivity and poverty. Current GDP is estimated at US\$ 447 per capita<sup>1</sup>; and more than 70% of the population lives permanently below the poverty line of US\$ 1 per day<sup>2</sup>. Madagascar is one of the least developed countries (LDCs) in the world, with growth hampered by several political and social crises. It occupies the 151<sup>th</sup> rank out of 187 countries with a Human Development Index (HDI) of 0.483 (HDI, 2012).<sup>3</sup> While it is already subject to climate variability and extreme weather events (e.g. cyclones), the country is at risk of increased vulnerability and degradation from anticipated climate change.

#### 2.1.1. General Country Context – Geography, Demography and Economy

##### *Geography*

2. The Republic of Madagascar, a South West Indian Ocean island located between latitude 11°57' and 25°35'S and longitude 43°14' and 50°27'E, is among the largest island countries in the world. Located 400 km off the east coast of Africa, separated from continent by the Mozambique Channel, Madagascar covers 587 041 km<sup>2</sup> of land which is 1 600 km long (North-South) and 580 km large (East-West), with 6 597 km of coastline (Figure 1).<sup>4</sup>
3. The main axis of the island extends in the direction North Northeast – South Southwest and relief follows this direction despite the fact that there is a strong asymmetry in the central region. The densely populated central highlands are characterized by terraced, rice growing valleys lying between grassy, deforested hills. Along the eastern side of the island, a steep and mountainous escarpment drops abruptly from the Central Highlands to the Indian Ocean. This eastern terrain hosts most of the last remaining pockets of tropical rainforest. The western and southern sides, lying in the rain shadow of the central highlands, are home to tropical dry forests, thorn forests, and deserts and xeric shrub lands. The descent from the central highlands toward the west is gradual. The western coast features many protected harbours, but silting is a major problem caused by sediment from the high levels of inland erosion carried by rivers crossing the vast western plains. The island's highest peak, Maromokotro, at 2,876 m, is found in the Tsaratanana Massif, located in the far north of the country. The Ankaratra Massif is in the central area south of Antananarivo and hosts the third highest mountain on the island, Tsiafajavona, with an altitude of 2,642 m. Further south is the Andringitra Massif with several peaks over 2,400 m, including the second and fourth highest peaks, Pic Imarivolanitra at 2,658 m and the 2,630 m Pic Bory. The massif contains the Andringitra Reserve and includes both Pic Soaindra (2,620 m) and Pic

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<sup>1</sup> World Bank. *GDP per capita (current US\$)*. Online. <http://data.worldbank.org/indicator/NY.GDP.PCAP.CD>

<sup>2</sup> Madagascar – National Report: Final Report of the process of preparation of Madagascar's participation in Rio+20. 2012. PNUD, 136 p.

<sup>3</sup> UNDP, Human Development Report 2013, [http://hdr.undp.org/en/media/HDR2013\\_EN\\_Summary.pdf](http://hdr.undp.org/en/media/HDR2013_EN_Summary.pdf)

<sup>4</sup> Government of Madagascar. 2006. *National Adaptation Plan of Action (NAPA)*, 2006, 75 p.

Ivangomena (2,556 m). On very rare occasions, this region experiences snow in winter at its high altitudes.

- The country is divided into six autonomous provinces – Antananarivo, Antsiranana, Fianarantsoa, Mahajanga, Toamasina and Toliara – which in turn are divided in 22 regions, further subdivided into 116 districts, 1 548 communes and 16 969 *fokontany*.



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Figure 1: Map of Madagascar

## **Demography**

5. The population of Madagascar has been growing rapidly over the past fifty years, with a growth of 318% between 1960 and 2011. In 2011, national population was recorded at his highest level with over 21 million inhabitants.<sup>5</sup> With an annual growth rate of 2.8%, the size of the population is expected to double every 25 years.<sup>6</sup> According to 2010 statistics, urban growth is progressing at a rapid rate (3.9 %/annum) and important parts of the population, including some urban centers and other economic development activities, are distributed in coastal administrative provinces.
6. Real per capita GDP is estimated at US\$ 237 in 2013 (at 2000 prices), significantly lower than the US\$ 735 average for sub Saharan Africa.<sup>7</sup> The 2012 Human Development Index (HDI) score of 0.483 highlights the deficiencies in well-being and life chances for the citizens, and places the country in the group of LDCs. The low real per capita GDP also indicates that the poverty rates are increasing, and that inequality is also on the rise, with significant gaps between rural and urban areas.
7. Approximately 70% of the total population lives in rural areas, depending directly on subsistence agriculture. Incomes are generally low, with the UN estimating that 71% of Malagasy population is living below the poverty line (RMDH 2007/2008), most of them in rural areas (73.5% of poor in rural areas against 52% in urban areas). Performance against the MDGs remains low, with only 26% of population having access to potable water (2000) and only 18% having access to electricity, compounded by rural urban inequalities. Poverty rates also differ by region, with the highest rates in the coastal regions of the east and south, where over 80% of the population is poor, and the lowest rates around the capital Antananarivo. Living conditions in rural areas have been steadily declining, particularly in terms of transport, health, education and market access. The growing population pressure brings with it several environmental and socioeconomic consequences including clearing of forests and wood lands to meet increasing demand for fuel wood and cultivable land, land degradation and soil erosion, degradation of marine ecosystems and coastal erosion because of overexploitation, pollution and waste generation, stress on health, education and employment service.

## **Political Context**

8. Since January 2009, Madagascar has been experiencing a political crisis generated by a change of power led by Andry Rajoelina, who, through street movement and army dissent, ousted then President Marc Ravalomanana. The country is now governed by a High Authority of the Transition, to which Andry Rajoelina serves as President. This political transition was not recognized by the international community, which led to a suspension of aid and development cooperation programs by many donors and partners.
9. Crisis mediation efforts were coordinated and supported by the African Union (AU), the Southern African Development Community (SADC), the United Nations (UN) and the

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<sup>5</sup> University of Sherbrooke. *Perspective monde – Madagascar*. Online. <http://perspective.usherbrooke.ca/bilan/servlet/BMTendanceStatPays?langue=fr&codePays=MDG&codeTheme=1&codeStat=SP.POP.TOTL>

<sup>6</sup> Madagascar – National Report: Final Report of the process of preparation of Madagascar’s participation in Rio+20. 2012. PNUD, 136 p.

<sup>7</sup> Regional Economic Outlook Sub Saharan Africa. 2013. Online: <http://www.imf.org/external/pubs/ft/reo/2013/afr/eng/sreo1013.htm>

Organisation Internationale de la Francophonie (OIF). After months of negotiations, a draft road map for an exit to the crisis was initiated on March 9, 2011, which was subsequently renegotiated and finalized in September 2011. After two years of negotiations and continued sanctions, a new electoral calendar was presented in February 2013 with the support of the UN. Presidential elections, originally scheduled for July 2013, have just taken place in a peaceful context, and the first round of voting was completed in November 2013, with a second round in December 2013. Legislative and municipal elections were also held in 2013.

10. The foreseen end of the crisis in Madagascar has led many donors to gradually resume operations and support in the country, many of which having continued their work through NGOs and local organizations throughout the past 2 years.

### ***Economy***

11. In Madagascar, the primary sector remains the basis of the national economy, including agriculture, livestock and fisheries. This sector provides 95% of national food supplies, employment to more than 70% of the active population and more than 75% of foreign exchange earnings through exports of various agricultural and marine products.<sup>8</sup> The rural sector represents a significant share of the Malagasy economy, estimated at about 43% of GDP in 2000 when including agriculture, livestock, fishing, forest and downstream agroindustries. Agriculture alone provides around 27% of GDP, 40% of exports and provides a living to about 75% of the population, underlying the heavy dependency of the Malagasy economy on agriculture. The secondary sector is beginning to grow, but the number of individual firms is higher than that of large enterprises. The contribution of industry to GDP does not exceed 18%. The service sector is dominated by those followed by the business travel and hotel operations.
12. The country's main electricity sources are hydroelectric and thermal plants. The hydraulic potential of the country is around 7 800 MW, but only about 250 MW are exploited, representing approximately 3%.<sup>9</sup> The country has to import oil products to meet its needs in energy and the national coverage of electricity is only about 21%.<sup>10</sup> Madagascar is among the solar rich countries in terms of energy potentials, and solar energy is currently used for water heating, drying agricultural products and generating power for telecommunications, lighting, drugs storage and pumping. Despite these potentials, fuel wood and wood charcoal remains the main energy source for a large part of Malagasy households, leading to high levels of deforestation (2.5% annually).
13. The industrial sector contributes to 16.5% of GDP.<sup>11</sup> It is characterized by a concentration around food processing, textile, wood, glass, cement, auto assembly plants, oil refineries, fertilizers and pharmaceuticals, paper and mining companies.<sup>12</sup> The industrialization of the country is hampered by the lack of energy resources and inefficient communication channels. Industrial activity is concentrated in the cities of Antananarivo, Mahajanga and Toamasina, which acts as a main commercial port.

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<sup>8</sup> Government of Madagascar. 2006. *National Adaptation Plan of Action (NAPA) under the UNFCCC*, 2006, 75 p.

<sup>9</sup> Etude de Vulnérabilité aux changements climatiques, Madagascar. Commission of the Indian Ocean, , 2011.

<sup>10</sup> Ministry of Energy, Policy Letter.

<sup>11</sup> CIA. The world factbook – Madagascar. Online. [https://www.cia.gov/library/publications/the\\_world\\_factbook/geos/ma.html](https://www.cia.gov/library/publications/the_world_factbook/geos/ma.html)

<sup>12</sup> Government of Madagascar. 2010. *Second national communication under the UNFCCC*. 161 p.

14. The long coastline of Madagascar is lined with a shelf equivalent to 20% of the land area of the island that has many opportunities to develop summer tourism and ecotourism. The number of tourists who came to Madagascar in 2005 was only 150,000, because of the lack of infrastructure, housing and communication between regions with high tourism potential. Despite the constraints, tourism is one of the main sources of foreign exchange for the Malagasy economy and is steadily expanding with 19% revenue increase in 2005, generating US\$ 184 million.<sup>13</sup>
15. The country's economic growth was considerably influenced by the political crisis of 2009, which led to the suspension of external assistance, including investment in infrastructure, and lower global demand after global economic crisis. After a sharp decrease in 2009, the economy is showing signs of slow recovery since 2011.
16. Madagascar has great economic potential, especially in terms of natural resources: exceptional biodiversity with a rare endemism rate of up to 90%<sup>14</sup>, major minerals (ilmenite, nickel, cobalt, iron, gold, uranium, hydrocarbons, etc.), over 5,000 km of favourable fishing coast, and agroclimatic conditions conducive to the diversification of agricultural land resources. However, the country has failed to take advantage of its wealth of assets to make major structural changes to the economy, due to recurrent political crises since the 1970s, the weak competitiveness of local processing industries and suppliers, insufficient transport infrastructure and the low quality of public services. Furthermore, recent data find that Madagascar is potentially under aided according to needs and performance based allocation criteria over at least the past five years.<sup>15</sup>
17. Given that the livelihood of 70% of the population is based on agriculture, and that most of the rural poor are self-employed and depend on agriculture for their living, extra efforts will have to be made to counteract the predicted impacts of climate change on agricultural, coastal zones, forestry and related sectors briefly described in section 2.1.2 through improved adaptation capabilities at all levels of the society.

### ***Agriculture and Livestock***

18. Madagascar is heavily dependent upon agriculture and livestock. Agriculture represents 43% of GDP, including agribusiness industries, and contributes to 40% of exportation earnings (mostly vanilla, coffee, sugar cane, clove, pepper, cocoa, cotton and coconut). It provides employment to 58.7% of the population and livelihood to 75% of the population. This sector is characterized by two major activities: subsistence rain fed production of food crops comprising rice, cassava, beans, bananas, corn and peanuts, and livestock production (mostly zebus) in the western part of the island.
19. There is therefore an urgent need to improve its performance so that it can contribute meaningfully to economic growth and poverty reduction. Some of the constraints which impede such transformation to a higher level of performance are:

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<sup>13</sup> Government of Madagascar. 2010. *Second national communication under the UNFCCC*. 161 p.

<sup>14</sup> Etude de Vulnérabilité aux changements climatiques, Madagascar. Commission of the Indian Ocean, 2011

<sup>15</sup> African Economic Outlook, 2013. <http://www.africaneconomicoutlook.org/en/>

- Low level of utilization (less than 10%) of available arable land due to lack of roads, infrastructure, irrigation, farm equipment and available financing.<sup>16</sup>
- Declining soil fertility, soil erosion and land degradation, further aggravated by a number of unsustainable agricultural practices including:
  - Expansion of cultivated land, degrading the vegetation cover (loss of 200 000 ha of forests per year);
  - Limited use of soil and water conservation measures;
  - Traditional practices, such as *slash and burn*, leading to low yields;
- Climate change related events such as droughts, cyclones and floods, as well as salt water intrusion into coastal lands as a result of sea level rise.

### **Water resources**

20. The availability of water varies greatly depending on climatic factors (rainfall patterns, occasional and lasting disturbances) and topography of each region. If some areas have an abundance of water (freshwater and groundwater), other locations on the island suffer shortages, like in the East and the semi arid South, where lack of access to water causes famine, cholera epidemics and loss of human life. The main rivers supply 57% of the country and the 13 largest abstractions have a total capacity of 493 million m<sup>3</sup> (108 million m<sup>3</sup> for irrigation and 385 million m<sup>3</sup> for hydroelectric plant).<sup>17</sup>
21. Renewable water resources in Madagascar are estimated at 337 km<sup>3</sup>/year, equivalent to 17 634 m<sup>3</sup>/year per person, and annual water withdrawal are of 14.78 km<sup>3</sup>/year. The vast majority of water resources are used for irrigation (97%), with a much smaller proportion for domestic use (2.03%) and industry (1.08%). Irrigation usually uses surface waters due to the rising cost of groundwater abstraction and is mainly used for rice cultivation (98% of irrigated land), the staple crop for the population (114 to 145 kg/year per capita in 2005).
22. In Madagascar, JIRAMA, the malagasy water and energy utility, provides most of the water supply and electricity. In 2005, the national supply of safe water and sanitation program was adopted, with the aim of achieving the Millennium Development Goals. A reform program is underway and, currently, approximately 46% of the population has access to drinking water at the national level (with 34% in rural areas).<sup>18</sup>

### **Forests**

23. The forests of Madagascar possess an extremely high biological endemism rate. More than 90% of Madagascar's endemic animal species live exclusively in forest or woodland.<sup>19</sup> The tropical forests of Madagascar are among the highest priority areas in the world for

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<sup>16</sup> CIA fact book, 2008. <https://www.cia.gov/library/publications/the-world-factbook/geos/ma.html>

<sup>17</sup> Heath, Tom. 2010. Changement climatique – Madagascar. Cranfield University, 4 p.

<sup>18</sup> 2010, CIA. The world factbook – Madagascar. Online. [https://www.cia.gov/library/publications/the\\_world\\_factbook/geos/ma.html](https://www.cia.gov/library/publications/the_world_factbook/geos/ma.html)

<sup>19</sup> Dufils, J.M. 2003. "Remaining forest cover". In *The Natural History of Madagascar*, ed S.M. Goodman & J.P. Benstead, pp.88-96. Chicago, IL, USA: University of Chicago Press.

biodiversity conservation.<sup>20</sup> However, it is estimated that Madagascar's forest cover has been reduced by 85% during the last 50 years, 80% of which can be attributed to slash and burn techniques, particularly practiced in remote forested areas.<sup>21</sup> A population of over 21 million and an annual growth rate of 2.8%, coupled with widespread dependence on subsistence agriculture and fuel wood cutting, makes deforestation in Madagascar a persistent problem.

24. In the 1950s, there was 160 000 km<sup>2</sup> of forest cover in Madagascar, corresponding to only 27% of the Malagasy territory.<sup>22</sup> Forest cover further declined to approximately 16% in 2000, to reach approximately 89 800 km<sup>2</sup>, a loss of 40% in 50 years.

### ***The Coastal Zone***

25. As regards the coastal zone, much like the rest of Madagascar, coastal ecosystems present a high degree of diversity, and each region contains its own specificity. Coastal forests, that play a key role in erosion and flood prevention, are subject to increased pressures from sea level rise and changing precipitation patterns, as well as baseline pressures such as slash and burn agriculture. It is estimated in Madagascar's first national communication that five types of forest formations cover 13 260 000 ha. "Dense arid forests" occupy the majority of the western coast, whereas mangroves are said to represent 3% of total forested area.
26. Mangroves – over 3 000 km<sup>2</sup> comprised of nine mangrove tree species<sup>23</sup> are found primarily along the western coast (with an estimated 50 km<sup>2</sup> on the eastern coast), where they are often associated with coral reefs, which protect the mangroves from ocean swells. The mangroves, in turn, capture sediment from the interior lands that threatens both reefs and seagrass beds, forming a comprehensive package of ecosystem services that protect from shoreline erosion, saltwater intrusion and inundation. Mangroves are threatened by development of urban areas, overfishing, and erosion caused by tree cutting in the highlands. Some mangrove areas have been converted to rice farming and salt production.
27. Madagascar also hosts a number of coastal wetlands of significant importance (approximately 4 317.2 km<sup>2</sup>).<sup>24</sup> Madagascar waters are home to high levels of fish diversity that rely on mangroves and reefs for habitat. Although many of the reefs have been seen to suffer from degradation due to climate change (bleaching), some of Madagascar's reefs have demonstrated resilience, a characteristic that could deliver some valuable insights on reef management and rehabilitation for future resilience. In addition to bleaching events due to higher temperatures (as seen in 1998, 2002 and 2005), reefs are subject to pressures from unsustainable or excessive fisheries, as well as siltation from the accumulation of excess sediment in bays (due to upstream erosion, in some cases).

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<sup>20</sup> Myers, N., Mittermeier, R.A., Mittermeier, C.G., da Fonseca, G.A.B. & Kent, J. (2000) Biodiversity hotspots for conservation priorities. *Nature* 403(6772): 853–858

<sup>21</sup> Harper, G.J et al, « Fifty Years of Deforestation and forest fragmentation in Madagascar, *Environmental Conservation* 34 (4): 325–333, 2007

<sup>22</sup> A conservative estimate of pre human forest cover suggests it had already lost more than half of its forest cover at this point; the loss may have been as much as two thirds, or more. Source : Harper, G.J. and *al.* 2007. "Fifty years of deforestation and forest fragmentation in Madagascar". *Environmental Conservation*, vol. 34, no 4, pp. 325 333.

<sup>23</sup> The mangrove trees found in Madagascar are mainly rhizophoras, (rhizopora mucronata, black mangrove bruguiera gymnorrhiza and ceriops tagal), white mangrove (avicennia marina), and donneratias (donneratia alba and lumnitzera racemosa). Details on the location, state and composition of mangroves in the targeted regions can be found in Appendix 15 (technical reports, Ecosystems).

<sup>24</sup> <http://ramsar.wetlands.org/Portals/15/MADAGASCAR.pdf>

## ***Fisheries/aquaculture***

28. With 5 603 km of coastline, nearly 400 000 hectares of mangroves, 50 000 hectares of salt flats favourable for shrimp aquaculture and 155 000 hectares of lakes and lagoons of halieutic interests, the fishing industry is one of the three main growth sectors (with mining and tourism) on which Madagascar has established its economic development. Since the early 2000s, the fisheries have grown to become the largest provider of foreign exchange.<sup>25</sup> The fishing sector contributes to 23.9% of the total export and contributes to 7% of GDP (2003). Fish products are among the main sources of currency of the country, especially the shrimp resources.<sup>26</sup>
29. Fishing activities related to marine and inland fisheries can be classified as industrial, small scale and maritime traditional fishing. In 2008, the fisheries potential are estimated at 480 000 tons, 300 000 tons of which are of commercial interest, while overall production (all products, species and types of fisheries combined) was only of 130 000 tons, that is only one third of the potential available.

### **2.1.2 Country Context: Environment and Climate**

#### ***Observed Climate Variability, Change and Impact***

30. Climate variability in Madagascar is due to the combined effects of its geographic position, relief, maritime influence and wind regime. The climate system is very irregular and climatic parameters vary from one year to another, especially concerning rainfall.
31. The climate of Madagascar is typically tropical, with regional variations. The annual average temperature varies between 23°C to 27°C with an average annual temperature range from about 3°C in the North to 7.5°C in the dry regions of the Southwest. The altitude has a significant effect on temperatures so that in Central Highlands, the average annual temperature is between 16°C to 19°C.
32. The Highlands, the Western region and the South have two distinct seasons: the rainy season (summer) from November to April, with maximum rainfall in December and January, and the dry season (winter) from May to October, with minimum rainfall in September and October. Whereas in the eastern region it rains almost all year round, and the dry season is almost non-existent (Figure 3).<sup>27</sup> Over 75% of annual rainfall is observed during the rainy season. Broadly speaking, the climate is tropical along the coast, temperate inland, and arid in the south but factors such as regional elevation produce significant regional variations. Rain clouds originating over the Indian Ocean discharge much of their moisture over the island's eastern coast where an average 3 500 mm (137.8 in) of annual precipitation supports the area's rain forest ecosystem. The central highlands are both drier and cooler, with frost commonly occurring overnight in the dry season. Snow, however, is limited to rare occurrences at the high elevation Ankaratra massif. The west coast is drier

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<sup>25</sup> National Office for the Environment. 2011. *Madagascar face aux défis du changement climatique – Capitalisation de nos expériences*. Madagascar, 197 p.

<sup>26</sup> Government of Madagascar. 2010. *Second national communication under the UNFCCC*. 161 p.

<sup>27</sup> Government of Madagascar. 2010. *Second national communication under the UNFCCC*. 161 p.

still, with high aridity in the southwest and southern part of the island where a semi desert climate prevails.<sup>28</sup>

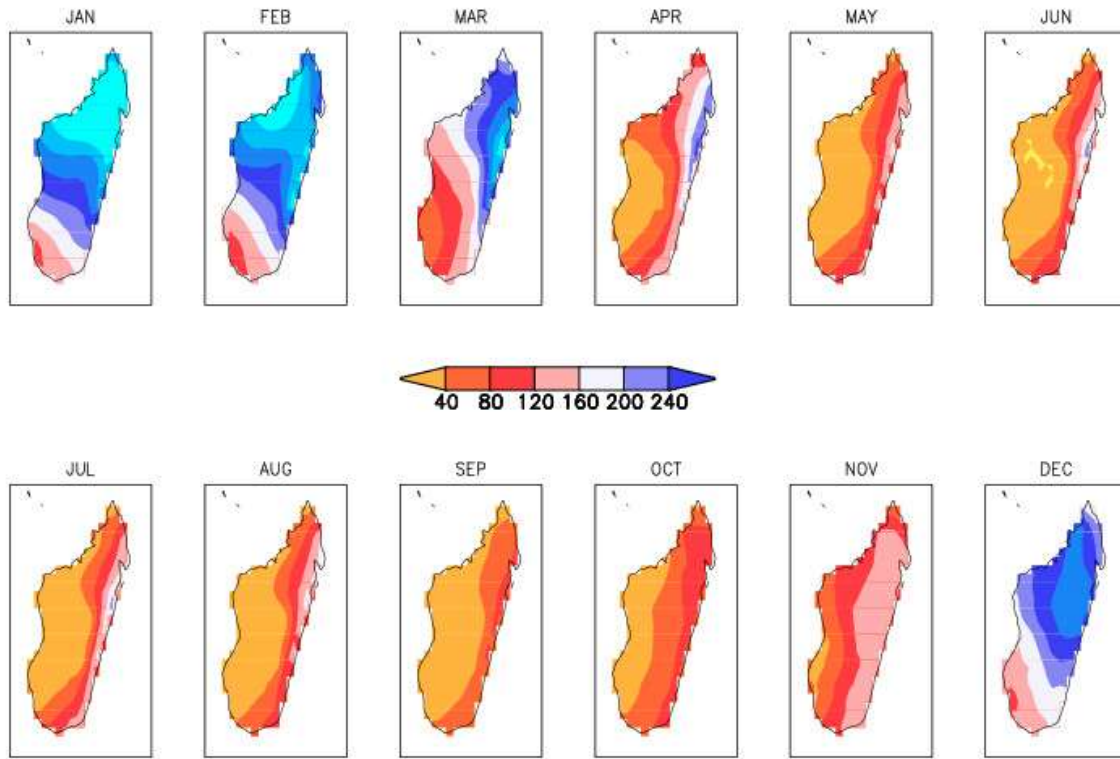


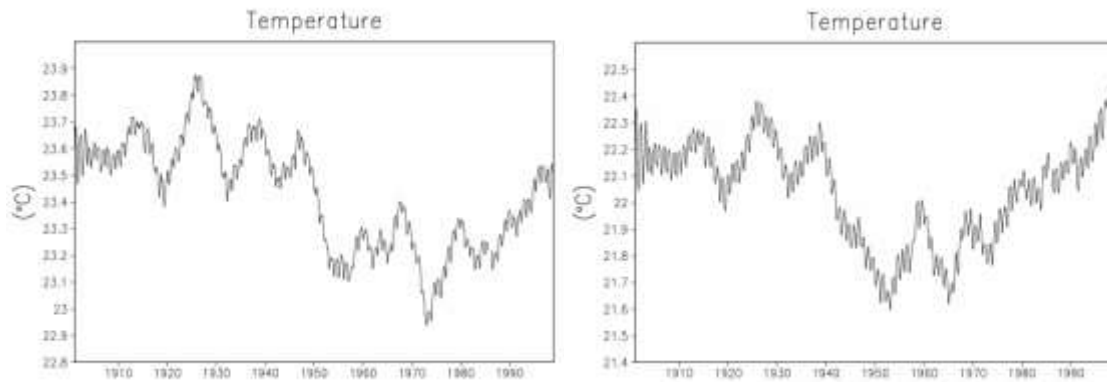
Figure 2: Monthly mean rainfall distribution (mm Month 1), 1991 2000. From ClimateResearch Unit, Mitchell et al. 2004

33. According to the Climate System Analysis Group of the University of Cape Town (CSAG)<sup>29</sup>, surface air temperatures in the southern half of the island has been steadily climbing since the 1950's and though it was also significantly warmer in the early part of the century, temperatures in the year 2000 are approximately 0.2°C warmer. In the northern half, temperatures started rising since the early 1970's, but have yet to reach temperatures seen in the first half of the century being approximately 0.1°C colder at the end of the century (Figure 4).
34. Similar to the global record, temperatures in both regions started cooling during the 1940's, reaching a minimum in the period 1950 to 1970. Global cooling during this period is mostly attributable to increases in volcanic and sulphate aerosols, after which the impact of anthropogenic emissions dominate the global temperature signal (IPCC, 2007). This is evident in figure 4 as a rapid increase in temperature between 1975 and 2000, more so in the south of the country. Superimposed on the positive temperature changes are decadal

<sup>28</sup> Government of Madagascar. 2006. *National Adaptation Plan of Action (NAPA) under the UNFCCC*, 2006, 75 p.

<sup>29</sup> Tadross, M., L. Randriamarolaza, Z. Rabefitia and Zheng Ki Yip. 2008. *Climate change in Madagascar ; recent, past and future*. South Africa : Climate Systems Analysis Group (CSAG) of University of Cape Town and Madagascar : National Meteorological Office, 18 p.

scale fluctuations that suggest climate variability acting at these timescales, which are also seen in the rainfall record.<sup>30</sup>

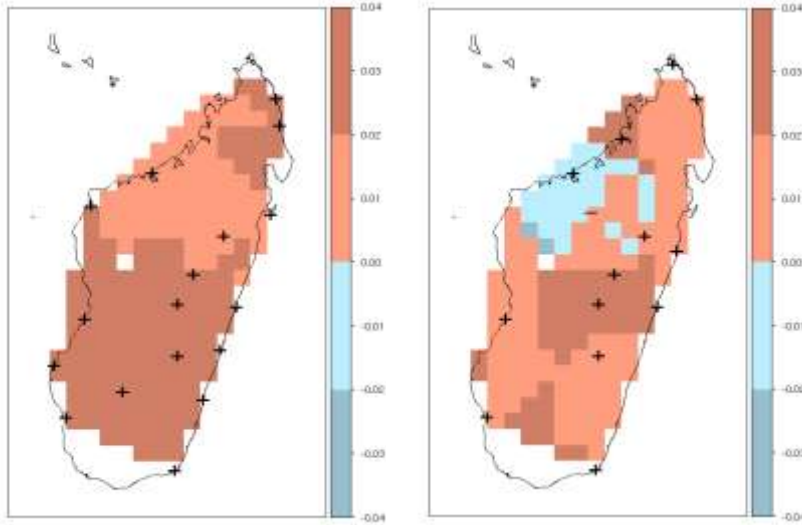


**Figure 3: Mean (6 year average) surface air temperature (°C) measurements, 1901 2000: a) southern Madagascar (43 51°E, 27 20°S); b) Northern Madagascar (43 51°E, 20 11°S). Climate Research Unit (Mitchell et al., 2004)**

35. In the past two decades, this increase in temperature manifests itself mostly by an increase in extreme minimal temperatures, which has a significant impact on crops and growing cycles. An analysis of 21 observing stations with daily records since 1961 (covering the period when anthropogenic influences on the global climate are detectable) indicates that there have been consistent increases in daily minimum temperatures, averaged for the whole year across all stations (Figure 5), with increases at 17 stations statistically significant. These increases in minimum temperature are consistent across all seasons throughout the year. Daily maximum temperatures increased at most stations during summer with less consistent changes during winter, resulting in mostly positive changes (except towards the northwest) when averaged over the year.<sup>31</sup>

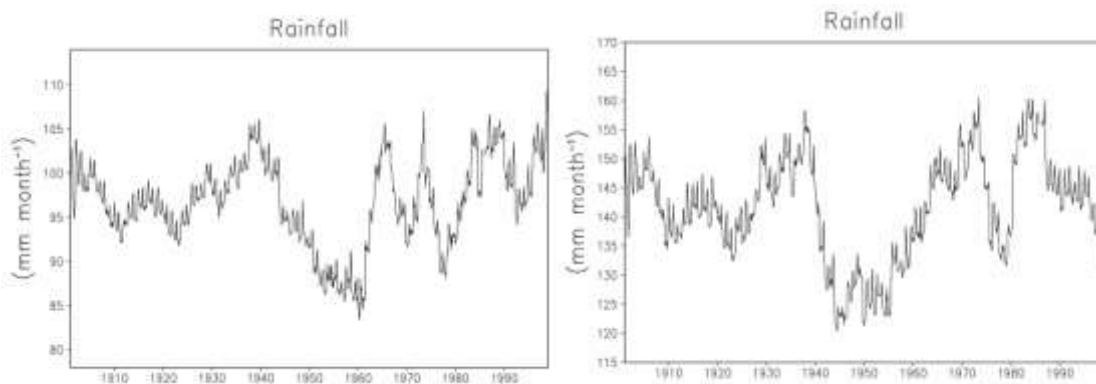
<sup>30</sup> Tadross, M., L. Randriamarolaza, Z. Rabefitia and Zheng Ki Yip. 2008. *Climate change in Madagascar ; recent, past and future*. South Africa : Climate Systems Analysis Group (CSAG) of University of Cape Town and Madagascar : National Meteorological Office, 18 p.

<sup>31</sup> Tadross, M., L. Randriamarolaza, Z. Rabefitia and Zheng Ki Yip. 2008. *Climate change in Madagascar ; recent, past and future*. South Africa : Climate Systems Analysis Group (CSAG) of University of Cape Town and Madagascar : National Meteorological Office, 18 p.



**Figure 4: Trend in annual average minimum (a) and maximum (b) daily temperature 1961 2005. “+”/“-” indicate where observations show a positive/negative trend (getting warmer/colder) that is statistically significant at the 95% confidence level or higher**

36. Regarding rainfall, between 1901 and 2000, there are no obvious trends in either region, though comparison with the temperatures since 1950 (Figure 4) suggests that over northern Madagascar the temperature record goes up when the rainfall record goes down, and vice versa. Over southern Madagascar, the relationship is the opposite with rainfall increasing when temperature increases.<sup>32</sup> Dry periods have had a tendency to become longer in the Central highlands and the eastern coast, whereas on the western coast, rains have become more intense. Annual rains have a tendency to increase since the 80s in the Southern half of the country, but to decrease in the north (Figure 5).

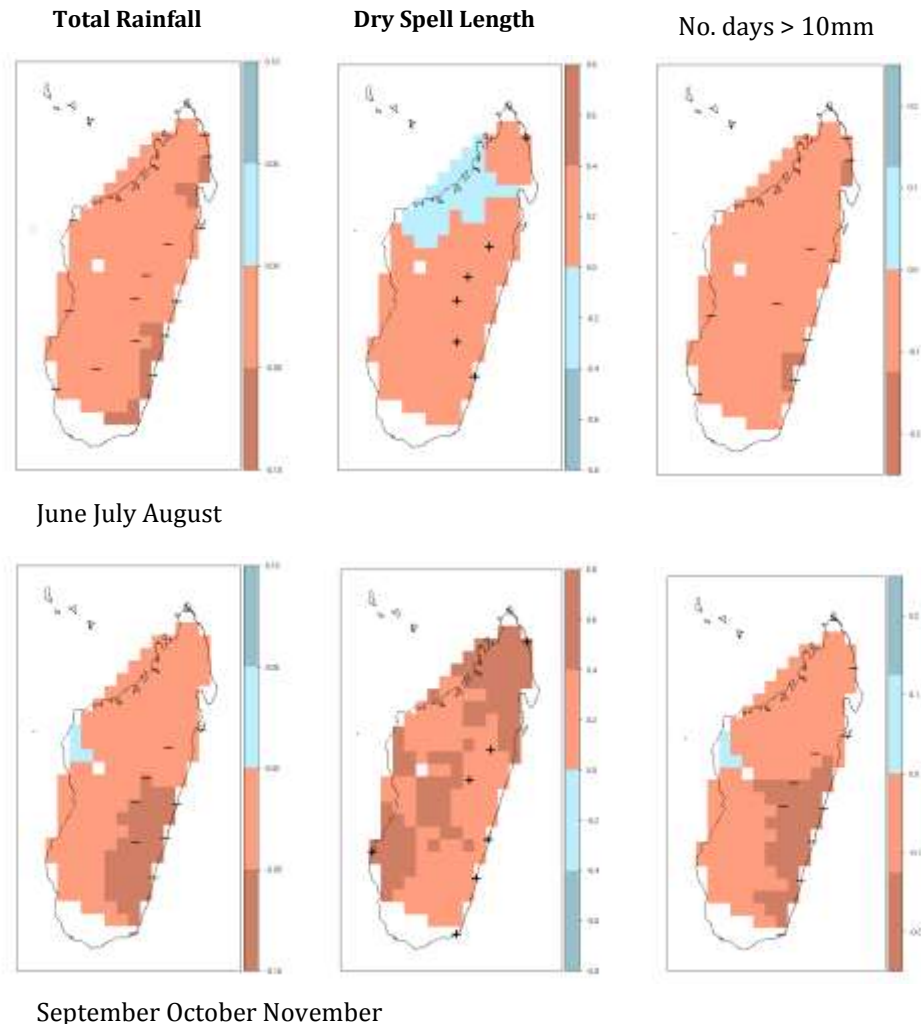


**Figure 5: Mean (6 year average) rainfall (mm month<sup>-1</sup>) measurements 1901 2000: a) southern Madagascar (43 51°E, 27 20°S); b) northern Madagascar (43 51°E, 20 11°S). Source Climate Research Unit (Mitchell et al., 2004).**

<sup>32</sup> Tadross, M., L. Randriamarolaza, Z. Rabefitia and Zheng Ki Yip. 2008. *Climate change in Madagascar ; recent, past and future*. South Africa : Climate Systems Analysis Group (CSAG) of University of Cape Town and Madagascar : National Meteorological Office, 18 p.

37. The most consistent changes in the record (in terms of statistical significance and spatial coherence) were found during the winter (June to August) and spring (September to November) seasons over the central and east coastal regions (see Figure 6). Total rainfall in both seasons over these regions has been steadily decreasing between 1961 and 2005, and this has been accompanied by similar increases in the length of dry spells, which indicates that rain has been falling less frequently. Some of these decreases in total rainfall are also because there have been less heavy rainfall episodes, as indicated by decreases in the number of days with rainfall greater than 10 mm. These reductions in winter and spring rainfall have also contributed to an increase in the maximum number of consecutive dry days over much of the country, especially the central and eastern regions. The maximum number of consecutive dry days often relates to the length of the dry season in regions, which experience one single dry and wet season each year (e.g. the western regions). Over the east coast these changes are more consistently associated with the reduced frequency of rainfall in winter and spring.

**Figure 6: Trends in average rainfall (mm day<sup>-1</sup> year<sup>-1</sup>), mean dry spell length (days year<sup>-1</sup>), number of days > 10 mm of rain (days year<sup>-1</sup>) for the June August (upper 3 panels) and September November (lower 3 panels) periods. Statistically significant (>95% confidence level) positive/negative trends are indicated by "+" / "-".**



38. Madagascar is also subject to extreme weather events related to current climate variability, chief among them cyclones, flooding and droughts. Each year, the island is subject to around 11 tropical disturbances, 3 of which reach the stage of tropical storm, bringing strong winds and huge amounts of rain.<sup>33</sup> These disturbances have become more and more frequent, and have gained in intensity over the past decades, occurring almost on a yearly basis, and leading to important infrastructure damages, losses of life, decreases in agricultural productivity, degradation of natural resources, and coastal erosion, with negative and prolonged effects on food security, access to clean water, irrigation, public health. These impacts place the Malagasy population and their development in a constant and increasing situation of vulnerability and precariousness. The most destructive since 1927 was Cyclone Geralda (February 2–4, 1994), which caused over 70 fatalities and left over 500 000 people homeless with the damage estimated at US\$ 45 million.

**Table 1 Source: Direction Générale de la Météorologie. 2008. Le changement climatique à Madagascar, 19 p.**

Basin	Period			
	1975-1989		1990-2004	
	Number of cyclones of category 4-5	Percentage of the total number of cyclones formed	Number of cyclones of category 4 -5	Percentage of the total number of cyclones formed
South Indian Ocean	23	18%	50	34%

39. Climate characteristics in Madagascar have definitely changed in the past five decades. There is clear evidence that temperatures have increased, following the global trend, and that the character of rainfall has changed appreciably. Consequences of these changes are many. For example, in the regions of the Southwest (Menabe, Atsimo Andrefana, Androy and Anosy Ihorombe) a deficit of rainfall, unevenly distributed, has hampered crop development. In the region of Androy, drought combined with the poor distribution of rainfall in the period of January to May 2010 caused the total failure of crops of maize, sorghum and cowpea. In Anosy, especially in the inner part of the region, insufficient and poorly distributed rainfall caused losses estimated at 40% compared to forecast for the second rice crop season. In those drought and cyclones prone regions, more than 80% of households surveyed (representing approximately 3 710 000 persons) have experienced a drastic drop in income and were thus affected by food insecurity in 2010. On those households, nearly 60% (2 253 000 persons) are affected by severe food insecurity because they earn less than 5 000 MGA per month and possess less than 3 months of food supplies from their own production.<sup>34</sup>
40. Moreover, during the past three decades, Madagascar appears to have been affected by frequent occurrence of disastrous climate linked hazards. For example, in 2010, more than 97 000 people were affected by a storm in Vatovavy Fitovinany (Mananjary, Ikongo, Manakara, Vohipeno), with nearly 38 000 households and 50 000 ha of farms flooded.<sup>35</sup>

<sup>33</sup> Government of Madagascar. 2010. *Second national communication under the UNFCCC*. 161 p.

<sup>34</sup> FAO/PAM. 2010. *Rapport spécial : Mission FAO/PAM d'évaluation de la sécurité alimentaire à Madagascar*, 76 p.

<sup>35</sup> National Disaster Management Programme Strategic Action Plan 2008-2010

41. Climate characteristics summarized above provide evidence of on going variability and change to which the country is extremely vulnerable, especially in the agricultural sector. This is also particularly true for the coastal zone, which contributes to the national economy through the fisheries and tourism industries, which in turn rely on biodiversity conservation and habitat preservation.

### **2.1.3 Climate change projections and predicted impacts on various sectors**

42. Climate change projections and predicted impacts may further exacerbate the situation and negatively affect the achievement of national development goals identified in various policy documents such as the Madagascar Action Plan (MAP), the National Environment Action Plan (NEAP) and the Integrated Coastal Zone Management (ICZM) Action Plan and the Millennium Development Goals. These projections and predicted impacts for Madagascar correspond with those made by the IPCC 2001 and IPCC 2007 reports and confirmed by the IPCC 2013 report for the Africa region in general and the Southern Africa sub region in particular.
43. According to the IPCC 2007 report, Africa is one of the most vulnerable continents to climate change and climate variability, a situation aggravated by the interaction of ‘multiple stresses’, occurring at various levels, and low adaptive capacity. In Southern Africa, climate change and variability is predicted to bring about increased temperatures (especially minimal temperatures) and declined amounts of rainfall. The intensification of evaporation and transpiration resulting from warming could have serious consequences on water demand, water balance and hydrological regime of lakes and rivers. The variation in rainfall will also affect the spatial and temporal distribution of water resources, runoff water availability, the agricultural calendar, production and crop yields, threatening food security.<sup>36</sup> Changes in southern African ecosystems are already being detected at a faster rate than anticipated. Climate change, exacerbated by human induced changes such as deforestation and degradation of vegetation cover, is a threat to forest’s ecosystems and affects mangroves and coral reefs, with additional consequences for fisheries and tourism.
44. The projection that sea levels around Africa will rise by 15 to 95 cm by the year 2100 would particularly affect coastal and island countries like Madagascar, with the following impacts: reduced productivity of coastal fisheries; coral bleaching; mass migration of population from the coast and associated health issues; salt water intrusion; loss of recreational beach facilities and negative impacts on tourism; loss of coastal infrastructure such as ports. Increased intensity of extreme weather events (droughts and floods) would also increase vulnerability to diseases, natural disasters and increase problems of daily life due to the destruction of resources.
45. Climate trends that are being observed will result in changing patterns of living, requiring adaptation and coping mechanisms to be developed by the population for their survival. A summary of specific climate change projections for Madagascar and their predicted impacts on the major economic sectors is succinctly presented below.

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<sup>36</sup> IPCC, Fourth Assessment Report, 2007.

## ***Specific Climate Change Projections for Madagascar***

46. Predictions by 2100 based on a number of climate models are as follows:<sup>37</sup>
- a) Warming will continue with an increase in mean annual temperature of 2.5°C to 3°C.
  - b) Annual rainfall will decrease, with a very marked reduction during the dry season (April and May), and intensely increase during the rainy season (December to February), except in the southern part of Madagascar where rainfalls remain weaker.
  - c) Tropical storms in the Southern Indian Ocean will increase in frequency and intensity (10 to 20% more intense).
  - d) Sea level will rise of 0.2 m.
  - e) Climatic hazards such as droughts and flooding will increase in frequency.
47. These predicted events could have significant negative impacts on various sectors of the economy and the overall national development goals. A number of such impacts are described below in Table 2.

**Table 2: Predicted Impacts on the Major Economic Sectors**

<b>Major economic sectors</b>	<b>Effects of climate variability</b>	<b>Effects of climate change</b>
Agriculture and livestock	Disruption of agro climatic requirements Change in types of crops and livestock	Change in usual activities Change in patterns of crops and livestock
Water resources	Irregular hydrological regime Degradation of water resources	An increase in the extent of flooding Disappearance of some water points
Coastal zones	Receding of coastlines Saltwater intrusion Coral bleaching	Disappearance of certain coastlines
Forests	Loss of biodiversity Soil degradation	Extinction of endemic species Change in the topography of the ground

### ***Agriculture and Livestock***

48. The agricultural sector is heavily dependent on weather conditions. Climate variability, combined with other factors such as deforestation by bushfires and *slash and burn* practices, cause significant impact in the agricultural sector, including the lack of control over water availability, disruption of agroclimate, loss of soil fertility, reduced agricultural productivity, loss of biological diversity and food insecurity. The sector is considered very vulnerable to climate change, mostly due to rainfall variability, frequency of severe natural disasters and irregular rainy seasons disrupting the agricultural calendar. Indeed, the

<sup>37</sup> The projected changes in rainfall presented here are taken from the statistical downscaling of 6 GCMs, three of which were used in the IPCC 3rd assessment report (HadCM3, CSIRO MK II, ECHAM 4.5) and three used in the AR4 (GFDL, MIROC, MRI CGCM). These downscaled projections of changes in rainfall are explained in Hewitson and Crane, 2006 and presented in Christensen et al., 2007. The range of future changes in temperature have been calculated using a combination of a regional climate model and 13 GCMs taken from the World Climate Research Programme's (WCRP's) Coupled Model Intercomparison Project phase 3 (CMIP3) multi model dataset → [http://www.pcmdi.llnl.gov/ipcc/about\\_ipcc.php](http://www.pcmdi.llnl.gov/ipcc/about_ipcc.php) /HadCM2, CSIRO TR, ECHAM4

reproductive and growth cycle of many plants is highly dependent on specific temperature ranges and volumes as well as on specific seasonal patterns of rainfall. For example, crop yields (rice and sugar) are estimated to decrease due to water stress and the development of parasites. Increased intensity of tropical cyclones could also decrease the vanilla production.

49. In more concrete terms, the Eastern, Central, Northeast and Northwest parts that suffer intense cyclones are prone to flooding, one of the first victims being the rice sector. The heavy rains and winds brought by cyclones cause the destruction of plantations, reduction of cultivated areas and consequently a loss of incomes for farmers. In the southern part, the severity of droughts increases pressures on water resources and raises the needs for irrigation, disrupting agricultural practices. In this region, the rainfed crops are affected by the late arrival of rains, uneven distribution and low rainfall. Corn crops, which require a lot of water, as well as beans and cassava, have brought the region into an agropastoral system, which is, however, not always favoured by the climate or the soil which is gradually destroyed by the practice of *hatsake* (maize slash and burn). Thus, crop yields will decrease because of increased water deficits, increasing the risk of food insecurity.
50. As many farmers do not have the capacity or resources to adopt effective adaptation measures, they remain highly vulnerable to the predicted climate change impacts, and may suffer heavy production losses.

### ***Water Resources***

51. Disruption of rainfall, increase in extreme weather events and increased potential evapotranspiration may alter the hydrological regime of the different basins in Madagascar. The combined anticipated changes of reduced rainfalls, higher temperatures and drought will result, on one hand, in a reduction of the rainfall/run off ratio, and on the other hand, in increased open water evapotranspiration, leading to reduced groundwater recharge.
52. In addition, while floods can be considered as naturally occurring events and that a number of factors such as topography, surface conditions and forest cover may influence the intensity of the flood episodes, the predicted increase in rainfall may lead to more frequent episodes of flooding in low lying agricultural lands. In other words, climate change would cause in different regions of Madagascar changes in the rate of rainfall, leading to difficulties for water management. This has the potential to impose additional pressures on water availability, water accessibility and water demand.

### ***Forests***

53. Climate change impacts on forests will lead to long term changes in vegetation cover, which will affect a number of endemic species. Direct impacts of dry conditions and high temperature on forest resources include a reduction in biomass growth, and higher frequency and intensity of forest fires. Increasing global atmospheric temperature will worsen the already alarming situation of forest degradation by water erosion and wind erosion, affecting forests of all types, including mangroves, lowland forests, coastal forests and swamp forests.
54. Projected climate change impacts on agriculture as indicated above may also have indirect impacts on forest resources as a result of increased clearing of forests for agricultural land as existing land loses fertility due to intensive wind and water erosion of topsoil as well as

increased harvesting of fuel wood by communities for livelihood, to offset low crop production.

### ***Fisheries/Aquaculture***

55. Sea level rise, which can be generalized in the whole country, combined with flooding of lowlying coastal areas and successive cyclones enhance coastal erosion and saltwater intrusion, as well as the destruction and degradation of essential ecosystems such as mangroves and coral reefs, resulting in a decline of fisheries resources and vegetative protective cover. For example, in Tulear in 2004, the reef was almost devoided of live coral, which resulted in a loss of 40% in terms of fish species. The areas most affected by this threat are the Western and the southwestern areas, where a significant part of the population, the Vezo, are traditionally fishermen, and the Northern area, where the intensity of cyclones is harmful to the aquaculture shrimp industry. The species that would be negatively impacted on by additional climate forcing are valued species that are mainly consumed locally, and this may threaten the food security of a significant proportion of Malagasy, and undermine the livelihood and traditional way of life of fisher folks.

### ***Coastal Zone***

56. The impact of climate change on the coastal zone can be seen first by the flooding of coastal lowlands and the reduction in the area of marginal reefs, disruption of oceanic current systems and sea level rise causing coastal erosion and intrusion of salt water. In 1997, the coastal retreat of Madagascar was estimated between 5.71 m and 6.54 m, and this is likely to reach about 225 m in 2100. This suggests that in the long term, much of the ports, beaches, cultural and historical sites located by the sea will be exposed to a high risk of degradation or disappearance.
57. Madagascar is also very rich in marine ecosystems. However, there is evidence that those ecosystems are threatened by various climate change effects, including sea level rise, flooding and increased salinity. Among the most vulnerable ecosystems to climate change are the mangroves and coral reefs. In 2100, it is estimated that the loss of mangrove related to climate change would be between 10 and 15%. A survey on the southwest coast of Madagascar also reveals an unprecedented coral bleaching: some reefs have lost up to 99% of their coral cover. In addition to the increase in temperature, ocean acidification, due to the absorption of CO<sub>2</sub> in the atmosphere, prevents coral to build, which makes them very vulnerable to erosion and sea level rise.
58. More than 1 070 000 people live in coastal administrative districts, and are directly concerned by sea level rise and the impacts of climate change on their livelihoods. Coastal zones are among the most vulnerable areas from cyclones, inundation, flooding or drought; and other global warming associated effects such as coral bleaching, seawater acidification or mangrove retreat will exacerbate the vulnerabilities of coastal populations that depend on seafood and natural ecosystems.

#### 2.1.4 The Problem to Be Addressed by the Project

59. Climate change affects (and is very likely to further affect) the country's development and in particular the development of the coastal zone<sup>38</sup> due to increased frequency and intensity of climate hazards such as droughts, episodes of heavy rain fall and flooding as well as sea level rise and coastal erosion.
60. Despite some ad hoc attempts to adapt, the capacity to address climate change impacts in Madagascar is still limited. The national and local administrations have limited systematic knowledge of climate change risks, adaptation needs and options, and individual, institutional and systemic capacities to address such impacts remain low. At the local level, communities have little knowledge or means to implement resilient development and livelihoods, and the ongoing degradation of the ecosystems on which they base their survival places coastal communities at particular jeopardy.
61. Hence, the *objective* of this LDCF project is to reduce vulnerability of the coastal zone to climate variability and change, through institutional capacity building, coastal protection and integration of climate change into policy and planning.

## 2.2 THREATS, ROOT CAUSES AND BARRIER ANALYSIS

### 2.2.1 Root Causes

62. The main problem facing the country today is its high vulnerability to climate change combined with its low capacity to address and adapt to this phenomenon. Indirect or non climate change linked root causes that further exacerbate the vulnerability include: poverty; high population density and rapid urbanization; excessive reliance on rain fed agriculture and coastline resources, poor natural resources management and limited use by farmers of climate resilient agricultural technologies; inadequate policy and legislation to address climate change issues.

#### *a) Poverty*

63. Madagascar is one of Africa's poorest countries. The 2012 Human Development Report of the United Nations Development Programme ranked the country 151<sup>th</sup> of a total of 187 countries (HDI, 2012). Poverty is widespread (UN estimating that 71% of Malagasy population are living below the poverty line) and predominantly rural, 73.5% of the rural population being classified as poor (against 52% for urban population). The highest rates of poverty are found in the coastal regions of the east and south, where over 80% of the population is poor, and the lowest rates around the capital. The poor, majority of whom are farmers, are caught in a vicious circle of risk aversion, limited use of agricultural inputs, low productivity and low income. Living conditions in rural areas have also been steadily declining, particularly in terms of transport, health, education and market access, affecting predominantly women.

#### *b) High Population Density and Rapid Urbanization*

64. The population of Madagascar has been growing rapidly over the past fifty years. Recent estimates put the population at over 21 million inhabitants with an annual growth rate of

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<sup>38</sup> The coastal zone has been identified as vulnerable in the NAPA hence is defined as a priority area.

2.8%. Urbanization is also increasing at a rapid rate of 4%/annum (2010).<sup>39</sup> The growing population pressure brings with it several environmental and socioeconomic consequences including clearing of forests and wood lands to meet increasing demand for fuel wood and cultivable land, land degradation and soil erosion, degradation of marine ecosystems and coastal erosion because of overexploitation, pollution and waste generation, stress on health, education and employment service.

### ***c) Excessive Reliance on Rain Fed Agriculture***

65. The agricultural sector employs more than 70% of the active population and provides 95% of national food supplies and 40% of foreign exchange earnings through exports of various agricultural products. This sector also represents a significant share of the Malagasy economy, estimated at about 27% of GDP for agriculture alone (2000), underlying the heavy dependency of the Malagasy economy and livelihoods on agriculture. This sector is, however, characterized by low productivity mainly because of erosion (due to topographical conditions as well as unsustainable land use), unsustainable or inadequate agricultural practices (e.g. traditional *slash and burn* land preparation), water pollution and lack of technical means leading to land expansion rather than intensification. The production systems are also inefficient because they are based almost exclusively on rainfall patterns that are unpredictable, and whose volume, spatial and temporal distribution are predicted to become even more variable in the near future.

### ***d) Poor Natural Resource Management and Limited Use of Agricultural Technologies***

66. The underlying vulnerability to climate change is exacerbated by maladapted and unsustainable agricultural practices coupled with a limited use of unsustainable agricultural technologies. Some of the natural resource management techniques that increase land vulnerability to climate change events are:
- a) Deforestation, land clearing and *slash and burn* agriculture;
  - b) Tree cutting that results in land erosion and even depletion of water resources;
  - c) Unsustainable exploitation of mangroves with the attendant coastal erosion and agricultural land salinization;
  - d) Lack of access to information, knowledge and material for the use of climate resilient technologies;
  - e) Limited use of innovative water harvesting technologies that increase available soil moisture for plant use long after the rains have stopped or when interspersed with drought periods.

### ***e) Inadequate Policy and Legislation to Address Climate Change Issues***

67. The pervasive impacts of climate change are felt in nearly all of the major economic sectors including, agriculture as well as livestock, forestry and fisheries, water resources and services including tourism. However, climate change issues are not yet fully addressed in many of the policies of these sectors, neither in the regional development planning

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<sup>39</sup> World Bank. See also [http://www.tradingeconomics.com/madagascar/urban\\_population\\_growth\\_annual\\_percent\\_wb\\_data.html](http://www.tradingeconomics.com/madagascar/urban_population_growth_annual_percent_wb_data.html)

frameworks and strategies. A more effective implementation of these policy instruments including the mainstreaming of climate change is hampered by, among others, slow progress towards coordination of the various efforts, and a shortage of financial resources.

68. Please refer to a graphic representation of the problem tree which is presented in Appendix 14.

### **2.2.2 Preferred Response**

69. The problem described above can be solved by a number of approaches. Firstly, all coastal zones could be equipped with state of the art protective infrastructures, such as sea walls, off shore dikes, breakwaters and other hard coastal infrastructure. This would help protect coastal zones against the impacts of sea level rise and increased storm and tide activity, but would entail very high costs. Another solution, although impractical, would be to program a gradual retreat from coastal zones. This could involve relocating thousands of people, cities, infrastructure and economic activity, some of which would have to be foregone. Another solution would be to increase the protection of coastal zones against sea level rise, coral reefs could also be rehabilitated, and combined with environmental rehabilitation on the coast, including the creation of forested buffer zones, could provide added protection against the impacts of sea level rise.
70. In order to solve the problem posed by erratic weather patterns, including droughts and floods, various solutions are also possible. This includes the creation of an early warning system that would provide early notice of extreme events. This solution was not retained due to high costs and the need for significant capacity building among the hydro-climate services. This in itself could be a stand alone project. Another solution is to provide local communities with capacities to react to extreme climate events and to derive livelihoods from natural resources despite climate variability and extremes. This includes providing support to extension services, upgrading agricultural technologies and practices, and actively pursuing diversification.
71. The preferred solution that this project seeks to deploy to address the problem described above, is the development and implementation of a sustainable and resilient integrated coastal development strategy that is adapted to each region's own needs and developmental aspirations and opportunities. This includes:
  - a) The improvement of knowledge of sector and locally specific vulnerabilities (social, economic and environmental), as well as the provision of tools, methods, and institutional strengthening for adaptive decision making at central and decentralized planning levels. (Components 1 and 3)
  - b) Significant investment into the rehabilitation of coastal protective and productive ecosystems, as well as the creation of adequate buffers against the effects of sea level rise and climate change through the use of the ecosystem based adaptation approaches. This includes infrastructure investments as well as investments in natural buffers. (Component 2)
  - c) In addition, local communities need to be empowered to deploy more productive, resilient and sustainable livelihoods strategies in order to better resist to the impacts of climate shocks. This includes demonstration of alternative livelihoods such as bee keeping, sustainable fish production, ecotourism and improved agriculture (please see Component 2 for more details).

72. The preferred response is to create adaptive capacity among all social groups, whether government or communities, from the local to the central administration level, while ensuring that the environment can be protected and managed in a way that allows it to withstand climate change impacts.

### **2.2.3 Barriers**

73. The project will address the following barriers that limits capacity at both regional and national levels to cope with and manage climate change impacts, as well as implement the above mentioned solutions.

#### ***Limited knowledge and capacity to effectively identify climate change and assess potential impacts on coastal zones***

74. The scientific and technical capacities required to identify climate change vulnerability, risks and potential adaptation measures are currently weak in Madagascar, and constitutes an important barrier to coping with and managing climate change impacts. Indeed, knowledge about climate change vulnerability and risks in the coastal regions is weak because of the lack of technologies and instruments as well as human resources capacities required for using, interpreting and processing them. In addition, there are no coordination mechanisms or coastal adaptation plans in place, which prevents comprehensive adaptation measures to be taken. In other words, scientific and technical abilities required for the identification of climate change vulnerabilities, risks and adaptations is not up to par, and is an important barrier that needs to be addressed.
75. This barrier will be addressed through Component 1, by producing scientific knowledge, capacity to analyse and disseminate data and information about vulnerability, as well as tools to support decision making. Component 1 will address this barrier by providing training on CCA and VA in coastal zones and by assisting in the development of participatory vulnerability studies which will support the identification of potential adaptation measures. The component will also provide tools such as downscaled climate models, agricultural production outlooks and risk maps. The component will also address the barrier by assisting regional authorities in integrating climate change adaptation issues into regional planning, in particular around ICZM coordinating platforms.

#### ***Degraded coastal ecosystems and unsustainable coastal resources management***

76. The purpose of an effective coastal zone management adaptation project is to assure the sustainable use of natural resources and to protect the numerous services provided by ecosystems. However, many of the coastal ecosystems of Madagascar, including mangroves, watersheds and shorelines, are currently degraded and cannot deliver as many services as before. The limited financial resources don't allow for any significant or efficient replanting, rehabilitating, revegetation, stabilization of shores, or for the installation of protective technologies in the sites that are the most vulnerable to climate change impacts. The coastal and marine ecosystem monitoring system, which is partly covered in two regions through the Environmental Dashboard exercise, is inadequate, which leads to a misunderstanding of ecosystem services. Awareness of coastal deforestation and sustainable land management is fairly low in Madagascar, resulting in the unsustainable use and of the coastal zone ecosystem, which has led to the further degradation of coastal ecosystems and is an important barrier that needs to be addressed.

77. This barrier will be addressed through Component 2, where ecosystem-based approaches to adaptation will be demonstrated. This will include rehabilitation of ecosystem buffer zones and ecosystem's productive services for increased resilience and coastal protection. In addition, the project will also support local communities in their effort to adopt more sustainable natural resource use practices to ensure long term sustainability. The ecosystem-based approach, which will be implemented through a combination of hard and soft measures such as mangrove and shoreline rehabilitation, coastal forest rehabilitation and management, combined with measures to assist local communities to develop better natural resources management practices, will help restore protective and productive environmental services. This component will address the barrier by supporting replanting, rehabilitating, revegetation of shores, and by installing protective technologies in vulnerable sites. By providing direct support to local communities, the component will remove barriers to the sustainable use of ecological buffer zones and fragile coastal ecosystems.

***Inadequate consideration of climate change adaptation measures into sectoral and development policies***

78. As discussed briefly above, an effective coastal zone management adaptation project must combine scientific and technical capabilities for the identification of climate change vulnerabilities, risks and adaptation measures, and rehabilitation of ecosystems to restore their protective services. In order to complete the picture, these fundamentals must be complemented with relevant national and sectoral policy instruments and an active participation of local communities. Knowledge of the impact of climate change on the various economic sectors as well as on climate change adaptation and ecosystem based adaptation has not been disseminated yet. Climate change is thus becoming an increasingly important issue to implement in climate change related initiatives and projects in Madagascar.
79. However, these are not being carried out properly yet. State budget allocations for communication, awareness raising and public education are rather inconsequential, no dedicated mechanism exists for sharing lessons learned from related pilot projects and experiences, and tentative efforts to mainstream climate change into sectoral and development policies are just beginning. Policy decisions made to mainstream climate change would alleviate this barrier, provided that credible evidence is presented on the actual and potential impact of climate events on important sectors of the economy, and provided that locally appropriate adaptation measures are known.
80. This barrier will be addressed through Components 1 and 3, which foresee activities to assist regional and national administrations in developing more resilient coastal management plans and development plans that take into consideration climate change impacts and adaptation options. Component 1 will support training for regional decision makers and planners and Component 3 will support the direct revision of legislative and regulatory frameworks in order to ensure that these are inclusive of climate change. These components will also support the revision of regional development plans and the development of an improved ICZM policy that is inclusive of climate change. Component 3 will also provide support to non-state actors such as NGOs and the private sector, to enhance their informed participation in these regional planning exercises.

## 2.3 GLOBAL SIGNIFICANCE

81. The island of Madagascar lies in the Western Indian Ocean Marine Ecoregion (WIOMER) which includes coastal and marine waters of the Comoros, Madagascar, Mauritius, France / Reunion and Seychelles. Located at the western end of the biogeographic province of the Indo Pacific, this ecoregion is very particular and has characteristics that are very unique. It has a rich ecosystem with high biological diversity and relatively high endemism. These ecosystems also offer unique or rare habitats of "flagship" species. These coastal biological systems are characterized by high biological productivity of coral reefs, but also seagrass beds and mangroves. WIOMER is one of 25 priority ecoregions of the planet.<sup>40</sup> Coastal and marine ecosystems provide important fishery resources, which contribute significantly to the income of coastal communities, and even constitute basic livelihoods in the poorest countries (Madagascar, Comoros).
82. Madagascar's coastline of 6 597 km contains valuable ecosystems and diverse resources, including mangroves (303 814 ha), coral reefs (3 540 km) and coastal forests, which shelters, among others, a total of 788 species of reef fish, one of the highest coral diversity of the Western Indian Ocean, and 8 species of mangroves on a total of 11 known in Africa. The economic value of ecosystem services provided by ecosystems in Madagascar is estimated at 3 145 M US\$ per year. About 429 618 ha is classified as protected areas, and parks and reserves are selected because of the endangered nature of their habitat type and/or the endangered species they shelter. The protected areas are: Baie de Baly (57 418 ha), Complexe Mahavavy Kinkony (300 000 ha), Kirindy Mitea (72 200 ha). Each region is home to a number of endemic species, a large number of which are endangered or even critically endangered.
83. A combination of irregular rainfall pattern, temperature and sea level rise may affect the mangroves, coral reef and forest ecosystems along the coastline. This will not only affect the rich biodiversity of the country, but will also impact the coastal communities that strongly depend on those resources for their livelihoods. A strong and effective coastal zone management adaptation project that address climate change vulnerability and risks, as well as triggers the implementation of adaptive, protective and policy related actions will contribute significantly towards managing potential negative impacts of climate change on these globally significant ecosystems.

## 2.4 INSTITUTIONAL, SECTORAL AND POLICY CONTEXT

84. The macroeconomic policy framework of Madagascar is essentially one of a free market with the primary aim of creating an enabling environment for the development of a private sector led growth and attract foreign direct investment, especially in export oriented industries, manufacturing, agribusiness, mining and tourism areas. Nevertheless, in order to address structural inadequacies of a weak economy, The Madagascar Action Plan 2007-2012, a strategy for driving socioeconomic development, was formulated in 2002 with the goal of transforming the country into a dynamic middle income country, socially, economically and scientifically over a 10 year period, in the context of the Madagascar Vision 2030 statement.

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<sup>40</sup> Government of Madagascar, Ministry of Environment and Forests, Department of Climate Change. 2013. *Rapport sur les écosystèmes côtiers des régions Boeny, Menabe, Atsinanana et Vatovavy Fitovinany*. 34 p.

85. The Vision is being addressed by successive MDG based PRSPs and sectoral plans. The third and current PRSP – the Madagascar Action Plan (MAP) – which covers the period 2007-2012, describes the commitments, strategies and actions that will ignite rapid growth, lead to the reduction of poverty, and ensure that the country develops in response to the challenges of globalization and in accordance with the national vision “Madagascar *Naturellement*” and the UN Millennium Development Goals.<sup>41</sup> The MAP includes 8 commitments declined in 54 challenges, which are priority actions and projects. The 8 commitments are: (1) Responsible governance; (2) Connected infrastructure, (3) Educational transformation; (4) Rural development and a green revolution; (5) Health, family planning and the fight against HIV/AIDS; (6) High growth economy; (7) Cherish the environment; and (8) National solidarity.
86. Each of these pillars include the cross cutting issues of gender and environment to ensure that they are mainstreamed. In other words, provisions are made in this strategic policy paper to enhance the capacity and output of productive sectors – including agriculture, fisheries, industry, mining, tourism and infrastructure – with emphasis on productive capacities of the poor and vulnerable populations, and to incorporate environmental concerns in all economic activities.
87. Some important policy, institutional and legal measures have therefore been put in place to address elements of these cross cutting issues related to the environment, including climate change mainstreaming. Such measures include the creation of the National Environment Office (ONE), which coordinates and execute the Malagasy environmental policy, and the development of national policy frameworks and strategies including the Madagascar National Environmental Action Plan (NEAP), and the National Adaptation Plan of Action (NAPA) on climate change (under the responsibility of the Ministry of Environment and Forests).
88. The NEAP was designed to protect and improve the environment while striving for sustainable development. Its four specific objectives are to: preserve and manage the heritage of biological diversity; promote sustainable development through better management of natural resources; improve living conditions in rural and urban areas; and develop human resources and institutional capacity. The NEAP constitutes the implementation of the National Environmental Policy set out in the Environmental Charter adopted by the Law 90-033. The Charter provides that the NEAP should contain three five-year Environmental Programs:
- a) Environmental Program I (1991 to 1996) aimed for the integration of all priority activities related to the environment in a single program (institutional component, methodological, procedural, financial and technical approaches, problems and emergency problems);
  - b) Environmental Program II (1997 to 2003) during which the management strategy of the environment and natural resources is based on the development of a regional and local approach to conservation and use of biodiversity and other natural resources;
  - c) Environmental Program III (2004 to 2009) taken over by the different actors of the procedures and environmental management.

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<sup>41</sup> Government of Madagascar. 2007. *Madagascar Action Plan 2007-2012*, 115 p. Online: [http://www.africaportal.org/sites/default/files/Madagascar%20Action%20Plan%202007-2012\\_0.pdf](http://www.africaportal.org/sites/default/files/Madagascar%20Action%20Plan%202007-2012_0.pdf)

89. During Environmental Program II, a policy regarding marine and coastal environment has been defined as part of the strategic component of the same name. This policy includes strategic areas such as the management of aquatic biodiversity and coastal area through information, education and awareness for the adoption of a behavior preserving resources, namely natural coastal protection by laws and regulations and standards of infrastructure construction in coastal areas. The implementation of the national policy of the marine and coastal environment was conducted as a pilot at some seaside resorts such as the area of Nosy Be, Sainte Marie and Fort Dauphin. Besides, another National Environmental Action Plan is currently being prepared to be implemented after 2012. Meanwhile, environmental actions will be undertaken within the framework of MAP.<sup>42</sup>
90. The NAPA, developed by the Ministry of Environment and Forests, after extensive consultations with stakeholders, reflects a national consensus on adaptation strategies to climate change. The goal is to address climate threats through actions that deliver immediate adaptation benefits, contribute to building local and national adaptive capacities, and build foundations for maximising longterm adaptation benefits. The NAPA strongly advocate for a more systematic consideration and inclusion of climate change related issues in sectoral policies and has identified 15 priority projects that address the five most vulnerable sectors to climate variability: agriculture, health, water resources, coastal zones and forestry. The rehabilitation and/or construction of dams and seawalls has been identified as the first of the 15 priority adaptation projects; the establishment of infrastructure such as dykes and groynes gradually as the sea level rises as the sixth; and the rehabilitation of degraded coastal areas, installation of windbreaks by plantations of casuarina trees, planting mangroves, rip rap of seashore and installation of wave breakers as the seventh.
91. More recently, the Government of Madagascar initiated the development of a national programme on Integrated Coastal Zone Management (ICZM) with the National Policy for Integrated Coastal Zone Management and a National Strategy for Sustainable Development of Coastal and Marine Zones<sup>43</sup>, with the Action Plan related. This framework represents political will to take into account in national development the economic, social and ecological importance of coastal and marine zones, a sector that has been marginalized for a long time even though it has enormous potential for sustainable development.
92. In accordance with the objectives of ICZM, the National Strategy is structured by the three strategic components targeted by the National Policy: the first concerns the governance of coastal areas, the second the economic development of coastal communities, and the third the preservation and conservation of natural resources and ecosystems in coastal areas. Six specific objectives are identified:
- i. Improving the context of management of coastal and marine areas to ensure sustainability in building management and operation of renewable resources (addressed through Component 1 of the project);
  - ii. Ensuring sustainable integrated management practices at all levels of decision (addressed through Component 1 and component 3);

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<sup>42</sup> Government of Madagascar. 2010. *Second national communication under the UNFCCC*. 161. See also: [http://www.sommetjohannesburg.org/initiatives/gouvernance\\_cas2.html](http://www.sommetjohannesburg.org/initiatives/gouvernance_cas2.html)

<sup>43</sup> National Integrated Coastal Zone Management Committee, 2010.

- iii. Improving the living conditions of coastal communities and make them participate in the economic development of the country (addressed by Component 2);
  - iv. Open up coastal zones and increase synergy between urban and rural areas (addressed by Component 2);
  - v. Ensure the prevention and reduction of marine pollution, erosion and sedimentation effects (Component 3);
  - vi. Maintain the marine and coastal biodiversity and ecological integrity of marine and coastal ecosystems (Component 3).
93. The National Action Plan for ICZM, as part of joint operational planning of implementation actions of the National Strategy, applies to the six specific objectives of the three strategic components stated above. The National Action Plan organizes in time and space the implementation of concrete activities that should lead to the achievement of 24 outcomes. It is implemented by sequence of five years called “National Programmes for ICZM” over a period of 10 years. The first National Programme for ICZM covers the period 2011-2015.
94. Climate change issues in the country are coordinated by the Ministry of Environment and Forests, through its Climate Change Directorate. The Ministry is responsible for the development of National Communications (Madagascar submitted its 2<sup>nd</sup> national communication in 2011), adaptation planning as well as reporting on emissions. The Ministry also coordinates Madagascar’s action under various environmental conventions to which it is a Party, including, among others:
- a) Convention on Biodiversity
  - b) Convention on Desertification
  - c) Africa Eurasian Waterbird Agreement
  - d) Convention on International Trade in Endangered Species
  - e) Convention on Migratory Species
  - f) Basel Convention on the Transboundary movement of Hazardous Wastes
  - g) The Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region
  - h) The Rotterdam Convention on Prior Informed Consent
  - i) The Stockholm Convention on Persistent Organic Pollutants
  - j) The Ramsar Convention on Wetlands
  - k) The Biosafety Protocol
95. Climate change adaptation strategies in the coastal zone are on their way to being embedded in the institutional, sectoral and policy context in Madagascar. Projects and

initiatives addressing this issue have a potentially high level of support for sustainability. However, despite the existence of macroeconomic policies and their variations at the sectoral level, their implementation through various programs and projects have been affected by the political instability that has prevailed in a periodic manner in Madagascar in recent years.

## **2.5 PROJECT FOCUS AND SITE DESCRIPTION**

96. The project is to be implemented in the coastal zone identified as a priority area for interventions under the NAPA. Four coastal regions namely Menabe, Boeny, Antsinanana, and Vatovavy Fitovinany have been selected as the focus of the project interventions.<sup>44</sup> The four regions were selected on the basis of a number of criteria applied to all the regions of the country during the project preparation inception workshop (Appendix 13). Each of the criteria was ranked according to best available knowledge and expert judgement, through a participatory exercise, for all regions. The criteria were:

- a) Degree of perturbations in the rainfall regime
- b) Water acidity, salinity
- c) Increase in the level and frequency of droughts
- d) Degradation of buffering ecosystems
- e) Number of floods in the past 5 years
- f) Decrease in fish stocks
- g) Sea level rise
- h) Coastal degradation
- i) Cyclones over the past 5 years
- j) Economic potential
- k) Degree of poverty
- l) Food insecurity.

### **2.5.1 Menabe Region**

97. The Menabe Region is a coastal region located in the southwest part of Madagascar and stands alongside the Mozambique Channel for 350 km. Its area covers 48 860 km<sup>2</sup>, about 8,4% of the total land area of Madagascar. The region is has an estimated number of 400 000 inhabitants in 2005, unevenly distributed through the region. Like all rural communities in Madagascar, the Region's economy is based mainly on agriculture, more

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<sup>44</sup> The project concept was originally intended to be implemented in the three first regions only. However, during the project design phase, the fourth region was added by stakeholders due to its significant vulnerability.

than 85% of its population depending directly on it for their livelihood (farmers or workers). The main professional occupations are not always stable. A crisis in the secondary sector requires the working population to return to agriculture or fishing. The ROR survey indicates that 81% of households in the region are engaged in secondary activities. This mobility, related to unforeseen situations, may cause households to run the risk of failing into the vicious circle of poverty. A favorable instability factor is the low skill level of the working population and professionalism of the agricultural population.



**Figure 7: Location of Menabe region**

98. The Menabe Region has a significant agricultural potential and is characterized by huge arable land and natural environments conducive to diverse types of activities such as agriculture (food, mainly rice, cash and industrial crops), livestock, fisheries and logging. However, the physical potential in rice growing land is underuse: only 30 000 ha on 45 345 ha have been operated since 2005. Problems related to water management and inadequate labor force are the main constraints to this activity. The other food crops that offer opportunities are not sufficiently exploited for food and income diversification. The region also has a rich diversity of fisheries. Traditional fishing plays an economic role at two levels: supply of domestic markets (local and outside the region) in freshwater fish and supplies, and supply for collectors and export companies. Industrial fisheries are mainly intended for exportation: Europe, Reunion Island, Japan and South East Asian countries. Up to 90% of the local coastal populations are traditional fishermen, heavily dependent on halieutic resources for their livelihood and incomes.
99. The region has a significant hydraulic potential in surface and deep water. Many bodies of water are located in the northern and eastern parts of the region (lakes, ponds and pools). Rivers cross through various plains, carrying rich alluvial sediments for the benefit of agriculture. The lakes are numerous and are of multiple interests. These lakes act as fish ponds producing hundreds of tons of freshwater fish (*Baraoa*, *Tilapia*, Carp), generating an additional source of income for the local population. They also provide irrigation water for rice and drinking trough for livestock. They have an ecological interest: cradles for protected wild birds such as *Mireha* (*Anas bernierri*), hospitable shelters for amphibians and reptiles such as crocodiles, caimans, freshwater turtles, and others.<sup>45</sup>
100. Annual rainfall in Menabe is low (750 mm), irregular and poorly distributed in space. It varies from 600 mm (Manja) to 1 600 mm (Malaimbandy). Drought increases from North to South. The region is also prone to frequent (probability greater than 50%) tropical

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<sup>45</sup> Government of Madagascar. 2006. *Plan Régional de Développement Rural (PRDR) – Menabe*. 128 p.

cyclones that form in the Mozambique Channel into the island between Maintirano and Morondava, which causes precipitation and sustainable floods.

101. In the Menabe region, the project will intervene in the communes of Tsimafana and Belo sur Tsiribihina (District of Belo sur Tsiribihina) to rehabilitate 200 ha of mangroves, and in the Communes of Bemanonga and Morondava (District of Morondava) to rehabilitate 300 ha of mangroves. The project will also work with communities in the communes of Commune Belo sur Tsiribihina (2 500 inhabitants), Bemanonga and Tsimafana (1200 inhabitants), Morondava (2 100 inhabitants) and Bemanonga (1 500 inhabitants) in order to promote enhanced and alternative livelihoods that assist local populations in sustainably deriving livelihoods from the environment.

## 2.5.2 Boeny Region

102. The Boeny Region is located on the northwestern part of the island and covers an area of 32 386 km<sup>2</sup>, which represents about 6% of the total area of Madagascar. It also has a long coastline of about 686 km, bordered by the Mozambique Channel. In 2008, the population of the region was 963 645, about 3,9% of the total population of Madagascar. Over 70% of the region lives in rural area, depending essentially on agriculture, livestock and fisheries for their livelihoods.



Figure 8: Location of Boeny region

103. The Boeny Region has a great diversity of agro soil resources that allows the production of a diverse range of industrial, cash and food crops on huge alluvial plains, baiboho (250 000 ha of arable lands) and low lying flood corridors. While possessing 30.2% of arable land compared to total land, only 7.4% of arable land is used, for a total agricultural area of 980 000 ha. The main agricultural activities are the production of rice, cassava, maize, groundnuts, tobacco, cotton, sugarcane and vegetable crops which are intended for self consumption, commercialization to Mahajanga and Antananarivo as well as for exportation. The region also offers good natural livestock farming conditions and has its market share in the bovine industry with a herd of 419 582 heads. This activity occupies a large part of the rural population. With 630 km of coastline, 9 000 ha of mangrove and more than 50 lakes, fishing and aquaculture are essential elements of the regional economy. However, from 1998 to 2004, fish production declined heavily. This reflects the scarcity of resource stocks, the most captured species being shrimps, fish, crabs, lobsters, trepangs, sharks, chevaquines, squids, slipper lobsters, oysters, seaweeds and eels.<sup>46</sup>

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<sup>46</sup> Government of Madagascar. 2006. *Plan Régional de Développement Rural (PRDR) – Boeny*. 137 p.

104. The region is drained by a particularly dense river network, making water available for a large number of activities, such as river and sea transport, water supply, fisheries, agriculture, hydropower. However, this hydrography depends on the relief and climate, with unpredictable regimes, translating into alternating floods and low flows. Major rivers in Boeny are : Boeny, Mahajamba, Kamoro and Mariarano. This network is complemented by the presence of large lakes with water bodies in favor of inland fisheries and inland waterway transport: Kinkony (the second largest on the island after Alaotra), Amboromalandy, Ampijoroa (which are both large dam reservoirs), Ambilivily, Mahazoarivo, Matsabory and Bondrony.
105. According to the Environment and Forests Directorate in Boeny, natural ecosystems were occupying 86% of the land area in 2000 with 28% woodland (forests and mangroves) and 56% grasslands (savannas and pseudo steppes), the remaining parts (2 %) being formed by water bodies and wetlands (2012). The vegetation is diverse, namely terrestrial ecosystems of about 667 640 ha (approximately 21% of the total area of the region). Protected Areas in the region cover an area of 486 231 ha, or 15% of the region: Ankarafantsika National Park (130 026 ha), PN Baly Bay (57 142 ha), Tsingy Namoroka (2 227 ha) and the new protected area, Mahavavy Kinkony. The region also has important marine and coastal ecosystems: mangroves estimated at 101 270 ha in 2000 (ONE, 2006), representing approximately 33% of the mangroves of Madagascar.
106. Like the rest of the west coast of Mahajanga, the Boeny region is characterized by two alternating seasons, the rainy season (October to April) with an average of 1 000 to 1 500 mm of water, and the dry season (April to October) with less than 10% of the total rainfall; it should be noted that half of annual rainfall is concentrated in February. The region is also prone to frequent cyclones ,which exacerbate floods (heavy rains), mainly in the most rural municipalities crossed by large rivers.
107. In this region, the project will intervene in the areas of the Bay of Mahajamba near the Betsiboka Estuary to rehabilitate 400 ha of mangroves, and in the Bay of Bombetoka to the Bay de Baly to rehabilitate 300 ha of mangroves. In addition, the project will work with local communities in Boanamary & Ampitsopitsoka (Mahajanga II District, 2 200 beneficiaries), Fokontany Ambrovy & Antsahanitia (Mahajanga I, 3 000 beneficiaries) and with communities residing in the protected area of Complexe Mahavavy Kinkony and Soalala Mitsinjo (1 300 beneficiaries) to pilot alternative and enhanced resilient livelihoods.

### **2.5.3 Vatovavy Fitovinany Region**

108. The Vatovavy Fitovinany Region is located in the coastal area of southeastern Madagascar. It covers an area of about 20 200 km<sup>2</sup>, which represents 3.4% of the total area of Madagascar. The length of the coastline is 246 km. The region has an estimated population of 1 062 747 inhabitants and with a high proportion of rural and agricultural households: 90% of heads of households are engaged in agricultural activities.



**Figure 9: Location of Vatovavy Fitovinany Region**

109. Geographical, climatic and human factors combine to make the region a set of differentiated agricultural landscapes. For the entire region, the total cultivated area is about 300 000 ha, about 16% of the total physical area and 42% of arable land. Overall, the region abounds with significant agricultural potential. Cash crop occupies the biggest parts, including pepper, cloves and coffee, which represents 40% of the coffee area in South East Madagascar. Fruit crops are also abundant, especially the bananas, lychees and citrus. Food crops still occupy a large place with over 45% of the cultivated area, cassava leading with over 52% of the total cultivated area before rice (43%). The poultry farming also accounts for more than 90% of the rural exploitations in Vatovavy Fitovinany. However, the extensive and intensive poultry farming, beekeeping and fish breeding are beginning to emerge with the technical and financial support from various stakeholders.
110. The Vatovavy Fitovinany region has great potential for inland and marine fishery resources. The presence of numerous rivers and shoreline length promote the development of fishing activities. Indeed, the hydraulic system of the area is quite dense, but the lengths of the rivers are short. The main rivers of the region have their sources in the hilly area of the cliff, which makes their outlet to the sea difficult. Major rivers are the Skaleona, Ionilahy, Namorona, Faraony, Managano and Matitanana. The region also posses the Pangalanes channel, one of the longest canals in the world, which is used mainly for transportation and fishing.
111. In terms of vegetation, the region is characterized by primary and secondary forest cliffs constituting 54% of the forest Corridor, coastal grasslands, savannas, steppes and pseudo steppes of the central zone and a coastal fringe forests along the Pangalanes channel. We are witnessing the degradation of natural vegetation due to deforestation caused by bush fires, tavy practices and the misuse of forest resources (charcoal, firewood and construction).
112. The climate is tropical humid, characterized by abundant rainfall brought by the east currents (trade winds) and the absence of a dry season. Of the nearly 285 km from north to south, temperatures are remarkably equal. The annual average is 25°C. Tropical cyclones across the Indian Ocean Region strike periodically in the region making this region among the most devastated by cyclones.
113. In this region the project will intervene in the city of Manakara, Manakara B, to construct an emergency sea wall of 5 m above hydrographic zero and 1 km long, starting from the existing sea wall and prolonging the area protected by 1 km towards the Eden City Hotel. This will be combined with shoreline reforestation along the same trajectory. In parallel, the project will work with local communities in Mangatsiotra and Antsary to support their development in terms of resilient livelihoods.

## 2.5.4 Atsinanana Region

114. The Atsinanana Region is located in the eastern part of Madagascar. With a coastline 285 km long and 75 km wide, the region covers an area of 22 382 km<sup>2</sup>, which represents about 4% of the total land area. The region is composed of seven districts and 84 municipalities, but only five of the seven districts (Tamatave I and II, Brickaville, Vatomandry Mahanoro and Marovoay) belong to the coastal area.<sup>47</sup> In 2011, the population of the region was 1 204 006, about 5.8% of the total population of Madagascar.<sup>48</sup> Over 80% of the region's population lives in rural area, depending essentially on agriculture, livestock and fisheries for their livelihoods.



Figure 10: Location of Atsinanana Region

115. The coastal plain of the Region possess a huge agricultural potential, through the quality of its soil supporting a variety of crops. The main agricultural activities are the production food crops such as rice, cassava, maize and sweet potatoes, which accounts for 19.6% of the total production, as well as fruit crops (banana, pineapple and citrus) which accounts for 41.5% of the total production. These crop productions remain however underdeveloped and only provide subsistence products. Cash crops such as vanilla, cloves (in almost the whole region), sugar cane (mainly in Brickaville), coffee and pepper are spreading in the region and constitute a great benefit for the Eastern populations. Traditional fishing also represents a significant source of income for coastal populations, the coastline providing annually several tons of sea products. On the other hand, the development of livestock, has many problems related to natural climatic conditions (temperature and humidity), animal care and grazing areas.<sup>49</sup>

116. In terms of vegetation, the region has only few bands of natural forests, the secondary formations and cultures occupying the largest part of the area. The dense humid evergreen forests and coastal forests represents the natural forests and constitutes the main environmental resources of the region. Secondary forests “savoka” succeed in primary formations after deforestation. Woody species are rare and the *savokas* cannot prevent the erosion that threatens soil fertility. However, the region has several existing protected areas covering an area of 64 028 ha and new ones covering 21 668 ha. This is due to the impressive environmental resources forms by an exceptional biodiversity, which features

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<sup>47</sup> Government of Madagascar, Ministry of Environment and Forests, Department of Climate Change. 2013. *Rapport sur les moyens de subsistance des régions Boeny, Menabe, Atsinanana et Vatovavy Fitovinany*. 76 p.

<sup>48</sup> Institut national de la statistique de Madagascar (INSTAT). *Population & démographie*. Online. [http://www.instat.mg/index.php?option=com\\_content&view=article&id=33&Itemid=56](http://www.instat.mg/index.php?option=com_content&view=article&id=33&Itemid=56)

<sup>49</sup> Government of Madagascar. 2006. *Plan Régional de Développement Rural (PRDR) – Atsinanana*. 184 p.

highly endemic flora and fauna species. This biological diversity makes the region one of the most famous areas for tourism.

117. The Atsinanana Region is directly exposed to the trade winds, which brings very heavy rains and combined with almost constant heat creates along the coast an equatorial climate. Of the nearly 285 km from north to south, temperatures are remarkably equal, with an annual average of 25°C. There are no real dry months on this side of the island. A peak is observed in the summer, from February to April, and the months from September to November are almost always less watered. Rains, cloudbursts or fine and lasting rainfall are primarily nocturnal. The Region is also the one most affected by cyclones in Madagascar.
118. In this region, the project will intervene near the City of Toamasina to undertake urgently needed shoreline stabilization by Analakinina Hopitaly Be, through the Rabemanjara Salazamay High School, before Amanalana (2 km), and along the same trajectory, to rehabilitate and complete the system of dykes, groynes and sea walls that are degraded (1.1 km). In parallel, the project will work with local coastal communities in Mahanoro and Vatomandry communes to promote sustainable and resilient alternative livelihoods.

## **2.6 STAKEHOLDER MAPPING AND ANALYSIS**

119. A wide cross section of Madagascar's society was consulted during the preparation of the NAPA. For the preparation of this LDCF project, a smaller but representative sub set of stakeholders was consulted and will participate in its implementation (see Appendix 13 for summary reports of the consultations in each region and during the project preparation phase). These stakeholders include Ministries; Government Agencies and Technical Institutions; Local Government Structures/Community based organizations; Non Governmental Organizations; Private Sector; Development and Technical partners.
120. An initial design workshop was held in March 2013, where stakeholders selected project regions and provided recommendations on project activities, components and outputs. Further consultations took place in Antananarivo with key ministries (Agriculture, Fisheries, Public Works) based on the project concept. The Project design team then went to each region to undertake detailed consultations with the different ministerial and technical services (environment, agriculture, fisheries, water, infrastructure and coastal zone management where available), as well as representatives from local NGOs, donors and ongoing projects. In each region, local communities were consulted during field visits, where the project design team gathered the relevant baseline data on infrastructures, ecosystems and livelihoods. Local sites were determined in consultation with regional administrations, based on a list of adaptation needs and urgent priorities.
121. Recommendations from the in field consultations were integrated into the revised project framework and list of activities, which was then subject to further consultation from capital. Continued consultations with the regions headquarters occurred during the second phase of the project design work, in particular to obtain detailed information on cost estimates for proposed activities, as well as information on local beneficiaries. The project framework and list of activities was circulated to partners, stakeholders and cofinancing partners for final comment.

**Table 3: Role and contribution of the stakeholders**

Role and contribution of stakeholders to the project		
<b>Organizations</b>	<b>Role and contribution to the project preparation</b>	<b>Role in the project</b>
Ministries and Departments		
Ministry of Environment and Forests (MEF)	Project Preparation Executing Agency, coordination of the project preparation phase. Representatives in each region were consulted and provided input on ongoing programs and projects, and helped guide field visits and site diagnostics.	Project Executing Agency. Improved capacity and opportunity to incorporate climate change into relevant policy instruments at central and decentralized level; will be responsible for coordinating all project activities, but in particular responsible for supervising ecosystem rehabilitation activities and performing EIAs as required.
MEF Department of Climate Change (DCC)	Project Preparation Executing Agency, coordination of the project preparation phase.	Will house the project coordination unit and act as Executing Agency.
Ministry of Agriculture	Participated in project launch and bilateral consultations at regional level. Representatives at the regional level supported the development of the thematic study on livelihoods and provided key information on the impacts of climate change on agriculture in coastal zones.	Will be responsible for monitoring the activities related to livelihoods and agriculture at the local level. Will benefit from sectoral training.
Ministry of Public Works	Participated in project launch and bilateral consultations at regional level. Representatives were consulted at the regional level and provided information on existing infrastructures, their state of degradation and other productive assets, as well as information on ongoing or planned rehabilitation initiatives.	Will benefit from sectoral training and will be responsible for supervising the activities related to infrastructure rehabilitation or construction in targeted sites.
Ministry of Water	Participated in project launch and bilateral consultations. Provided information on water related infrastructures in coastal zones and ongoing projects.	Will benefit from sectoral training and will be responsible for supervising the activities related to water in targeted sites.
Ministry of Health	Participated in project consultations at regional level. Provided information to support the development of thematic reports on ecosystems and livelihoods.	Will benefit from sectoral training and will be invited to participate in activities related to water in targeted sites.
Ministry of Tourism	Participated in project launch and bilateral consultations. Provided information on touristic potential and	Will be responsible for activities related to the development of ecotourism.

	exploitations in coastal zones and in particular on potential for ecotourism.	
<b>Government Agencies and Technical Institutions</b>		
National Meteorological Office	Provided data to support the development of project documentation, including data on climate. Provided information on the state of hydro climate monitoring equipment towards the development of the infrastructure thematic report.	Will be called upon to provide climate data and to perform downscaled climate models for the east and west region, following training.
Comité National pour la Gestion Intégrée des Zones Côtières (CN GIZC)	Participated in launch and bilateral consultations. Provided information on the current status of legislative and institutional development regarding coastal zone management at national and regional level.	Will be a main executing partner for the project. Will participate in PSC as co-chair and will oversee the development of national coastal adaptation plans and regional IZM Frameworks and plans.
Comité Régional pour la Gestion Intégrée des Zones Côtières (CR GIZC)	Menabe committee consulted. Provided information on its functioning, lessons learned applicable to other regions, and expressed its needs as regards the integration of climate change into its work.	Will be created in three regions. In Menabe will be responsible for monitoring activities of the project at regional level and will benefit from technical assistance for the development of planning frameworks.
Vice primature en charge du développement et de l'aménagement du territoire (VPDAT)	Was consulted at regional level during site visits. Provided information on land use planning practices in coastal zones and provided context on the potential integration of climate change into land use planning frameworks.	Will benefit from targeted training on resilient land use planning. Will participate in the regional coastal zone management committees and will be invited to participate in adaptation planning at regional level.
Bureau National pour la Gestion des Risques et des Catastrophes (BNGRC)	Was consulted at regional level and national level to provide statistics on national disasters, droughts, floods and cyclones, and provided information on disaster preparedness and management in the context of the thematic report on coastal governance.	Will be invited to participate in adaptation planning at central and regional level and will benefit from training provided by the project.

122. NGOs and the private sector will also be called upon to participate at national, regional and local level, through trainings, awareness raising campaigns, and local activities in communes. NGOs can provide a useful relay between the project and local communities, and community based associations will be sought out in project sites to provide the necessary organization for project activities involving the provision of support for enhanced or alternative livelihoods. Private sector operators (mostly existing ones) will also benefit from training on potential economic opportunities, including ecotourism. In this regard, the project will benefit from linkages with other baseline projects that have

created a set of potential small private sector enterprises that can act as interlocutors in this project. At local level, women's groups, cooperatives, or enterprises will also be targeted to benefit from training and capacity development regarding sustainable and resilient livelihoods.

## 2.7 BASELINE ANALYSIS AND GAPS

123. The following gaps and barriers characterize the current baseline situation:

*Limited knowledge and capacity to effectively identify climate change and assess potential impacts on coastal zones*

124. In recent years, Madagascar has begun to lay the groundwork for the creation of Integrated Coastal Zone Management policies, plans and programs in the regions and at national level. In parallel, there is also nascent capacity for addressing climate change at central levels, mainly through ad hoc adaptation funding. However, this capacity remains centralized among the three or four key sectoral ministries at central level (Environment, Agriculture, Water), and there has yet been an effort to build decentralized capacity. The Coastal and Marine policy contained in Environment Programme II contained pillars such as marine biodiversity management through information, awareness raising and communication, aiming mostly at the adoption of conservation practices. Laws and rules on coastal zone infrastructure were also adopted in that context.
125. More recently, a few initiatives on climate change are being implemented: for example, the Ministry of agriculture has developed its National Strategy on Climate Change that gives primary attention to adaptation; the Ministry of water is intending to elaborate a national water policy document that would take into consideration various climate change issues; a national land use policy is also available that integrates climate factors; while other sectors are currently undertaking sectoral vulnerability assessments. These national level efforts set the stage for addressing climate change at a macro level, but they remain to be reflected in lower level planning documents, namely at the regional level.
126. While a number of general sectoral vulnerability studies and assessments have been conducted, including through the National Communications, there exists very little information on local level vulnerabilities. This includes a marked lack of data, know how and methodologies for assessing the vulnerability of key productive assets as well as the vulnerability of the environment in each of the four targeted regions. To date, there has not been a downscaled climate model that can take into consideration the climatic differences between the East and West coast of Madagascar, or regional specificities.
127. The national committee on Integrated Coastal Zone Management is comprised of the following ministries: Prime Minister's Office, Environment and Forests, Water, Mines and Hydrocarbon, Decentralisation, Finance, Fisheries, Agriculture, Livestock, Tourism, Land use Planning, Maritime transport, Higher education and research. The NICZM Committee also includes participation from the Maritime Agency, the agency in charge of fighting against marine pollution, the national environment office, the national tourism office, the fisheries institute of marine science, the National center on environmental research, the national center for ocean research, Madagascar national parks agency, and a few environmental NGOs.

128. At the regional level, only Menabe has so far succeeded in creating a similar coordination mechanism, which has authorities delegated from the National ICZM committee. Its mandate is to define the strategic orientations and action plans that will serve as a framework for the Regional Development Directors and General Secretaries (who represent the regional executive). Among the members of the RICZM committee, are included: the commune of Morondava, the Regional Development Committee, the Working Group on Rural Development, and the Regional Directorate of Environment and Forests, Water, Communication, Mines, Public Health, Tourism and the Arts, Fisheries, and Statistics; as well as the National Center for Training and Environmental Studies, the Police force, Television, and eight NGOs.
129. The Menabe RICZM Committee focuses on the development of fisheries as a regional priority, and according to available financing. The region has also developed its IZCM plan that aims at achieving the following 8 strategic results, and integrated in the Regional Development Plan:
- Make maritime fisheries clean and safe
  - Develop tourism and ecotourism
  - Improve economic and touristic communication
  - Improve fiscal and tenure frameworks
  - Increase security of goods and people
  - Protect and valorize mangroves
  - Protect and valorize reefs
  - Protect cities and beaches
130. There are no policies or programs on coastal zone management in Antsinanana, except for one prospective project on shoreline protection executed by NGOs in Tamatave (currently seeking financing). In Boeny, there is also no specific planning related to coastal zones. The regional development plan includes strategic investment orientations, but does not take climate change into account. There are also no coastal zone planning frameworks in Vatovavy Fitovinany, and the Regional Development Plan or other planning tools such as commune development plans or urban plans, do not currently include climate issues. There is, however, a process for environmental conflict or complaint resolution in Vatovavy Fitovinany and Antsinanana, as well as contingency plans in case of environmental disasters.
131. In Boeny and Vatovavy Fitovinany, there is an Environmental Dashboard that is comprised of information on key environmental indicators, whose objective is to produce and disseminate information that can support decision-making by various sectors. The Dashboard includes information on Biodiversity, Soil and Vegetative cover, Shoreline for coastal zones, Continental Waters, Climate and Climate changes, and Urban environment.
132. Additional details on the governance mechanisms in each region can be found in Appendix 15 in the Governance thematic report that was prepared during the project design phase.

### *Degraded coastal ecosystems and unsustainable coastal resources management*

133. A diagnosis of the state of ecosystems was developed during project design that reveals a number of prevailing conditions (see Appendix 15 for the complete report) regarding ecosystems. In Madagascar, major rivers and estuaries support an estimated 304 000 ha of mangroves, of which only 5 000 ha can be found on the east coast, with nearly 98% of the

mangroves situated on the western part of the island facing the Mozambique Canal. Coastal forests, of which the most studied are located on the east coast, are fragmented yet remain home to impressive biological diversity.

134. In **Boeny**, the coastal ecosystem is mostly concentrated in the Bay of Mahajamba, with 202 km of mangroves towards the north of the region in Betsiboka, 21 750 ha in Mahavavy Kinkony, and the protected area of Baly Bay (57 418 ha). There is a coastal forest of 49 253 ha (mariarano) and 5 300 ha of mangrove in the Southern part of the region. In 1993, the area covered by mangroves in the Region as a whole was estimated at 113 923 ha, whereas in 2000 it was estimated at 101 270 ha, or a loss of 11% in 7 years. At this rate, an estimated 80 000 ha would remain today. However, the mangrove in Boeny is facing increased human pressures from the dependency of local populations on natural resources for livelihoods, including encroachment for rice cultivation, salt production, and deforestation for fuelwood or timber making.

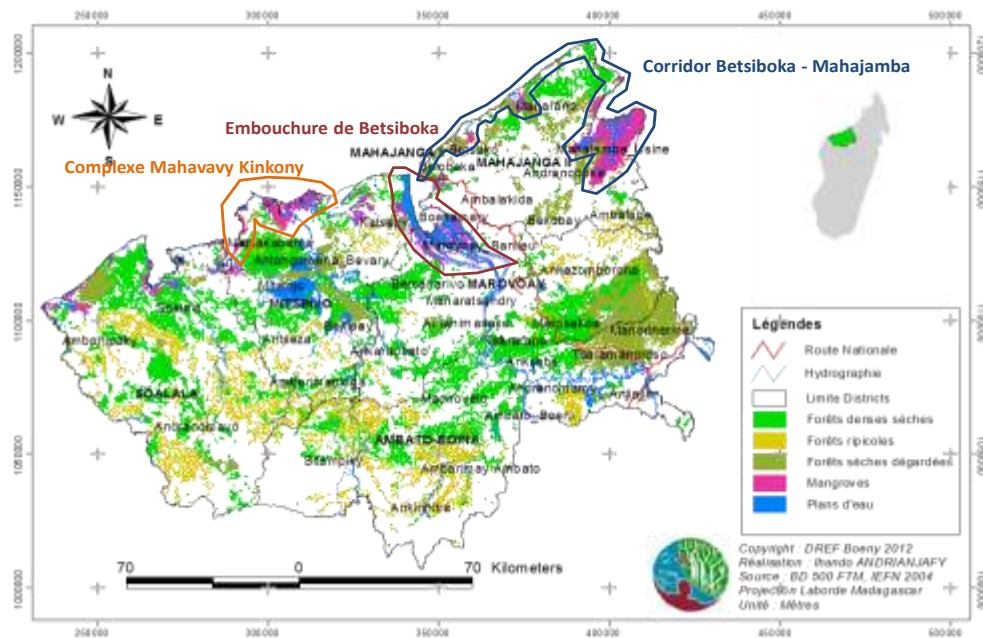


Figure 11: Mangroves, degraded dry forests, dense dry forests and riparian forests in the Boeny Region

135. With an urbanization of 40%, urban environments are becoming increasingly important, and this is where major productive and infrastructural assets are concentrated. There are protected areas: covering an area of 486 231 ha, or 15% of the region: Ankarafantsika National Park (130 026 ha), Baie de Baly National Park (57 142 ha), Tsingy of Namoroka (2 227ha) and the Mahavavy Kinkony Complex.
136. The main sources of livelihoods in the region are still agriculture related, with 33 of the 43 communes practicing rice cultivation as a primary source of income, followed by cassava and maize. If most of the production is destined for local consumption, some districts can sell on regional and national markets. There is also a large, but disorganized, production of fruit trees in the area, which serves as additional income and nutrition for households. Livestock is also quite frequent in the area (bovine, ovine, goats). However, it is fisheries that are the main engine of economic development in the area, with large (often over

exploited) stocks of fish, crustaceans, molluscs, and seaweeds. Finally, tourism is a growing industry, with nearly 900 jobs and over 15 000 tourists.

137. The coastal ecosystem is mostly characterized by mangroves and coral reefs in **Menabe**. The mangroves in Menabe represent 3% of the total forest cover of the region and 10% of the country's total mangrove cover, distributed around the Triribihina delta (north of the region to Morondava) and in the National Park of Kirindy Mitea, representing an area of 309.7 km<sup>2</sup>. Reefs are concentrated in the National Park, with an area of 193 km<sup>2</sup>. Mangroves are particularly important to the population who derive their livelihoods from crab fishing, traditional fishing and who collect mangrove hardwood for construction (timber and boat making). The mangroves in this area are home to rare flora and fauna, some species of which are endangered or critically endangered.
138. The area is subject to rapid deforestation (nearly 34% of advanced degradation), through disorganized, unlimited or over exploitation (including of fishing stocks), in areas near cities and mangroves. Price fluctuations have led to disrespect for fishing norms and rules, and to the multiplication of informal fisheries micro enterprises, in particular in the crab sector.

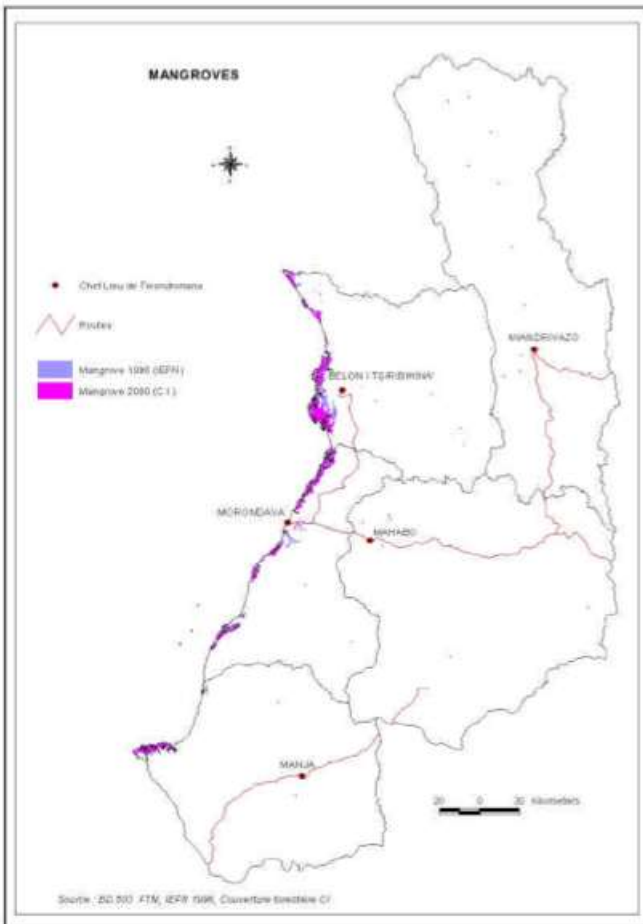


Figure 12: Location of mangroves in Menabe region

139. 60% of people in the Morondava district get their main income from agriculture, but this figure increases to 90% in other districts. Main crops are rice, peas, beans, lentils, but also industrial crops such as tobacco, peanut or sugar cane. Livestock grazing is also extensive in the area, concentrated mostly on bovine species, whereas fisheries provide a varied stock of halieutic species. Industrial, commercial, as well as traditional fishing function side by side, with nearly 90% of the coastal population describing themselves as depending primarily on fisheries for their livelihoods and income.
140. In **Antsinanana**, as with most of the western coast, the ecosystem is less developed. Reefs are only found in Foulpointe or Toamasina, representing approximately 313 ha. Small lagoons abound in the area. There are only 50 ha of mangroves due to the fact that the conditions are not conducive to mangrove growth in the area. The coast in Antsinanana has coastal forests that house a great diversity of flora and fauna, as well as coastal lakes. The areas provide livelihoods in the form of fisheries and coastal tourism, which is experiencing a sharp rise, cash crop agriculture (vanilla, sugar cane, coffee, etc.), and medicinal plants. Coastal flora is adapted to growth on sand dunes, which house a dense coastal forest. The main river network consists in the Pangalanes Canal and the coastal lakes connected by artificial canals. This is where most ports are located (Toamasina, Vatomaniry and Mahanoro). The Pangalanes system covers an area of 18 000 ha and includes all types of biota (freshwater and marine). The area is subject to increasing use and population growth, as the economic and touristic potential is exploited in the area. Rural populations continue to practice “tavy”, or cultivation in the ashes of felled trees at the end of dry season. This creates a decrease in forest cover and soil fertility, leading more communities to turn to fisheries for livelihoods, which in turn leads to overexploitation of fish stocks. It also accelerates the degradation of coastal zones through sedimentation, siltation, pollution, erosion and migration.
141. Regarding livelihoods in the region, with 80% of rural populations, most households depend on agriculture and natural resources for livelihoods. Primary crops such as rice, cassava, and maize represent 19.6% of the cultivated areas, whereas other crops such as fruits (41%) are disorganized and represent only subsistence level productivity. Fisheries, livestock and crafts provide additional sources of income. Traditional fisheries delivers a few tons annually, using small crafts and tools, based on the rich ecosystems provided by the Canal de Pangalanes.
142. In **Vatovavy Fitovinany**, the ecosystem is varied and includes: 1.5 million ha of coastal prairies, dense humid forests, agricultural and paddy land. Coastal forests are estimated at 9 905 ha. The shoreline is characterized by small reefs forming a barrier at the entrance of the Manakara port, and an area of dunes, which is rich in marine species (crustaceans, fish, etc). Coastal plains are home to agricultural lands for both rice and cash crops. However the siltation of estuaries, the increase in population and the pollution in the area are creating pressures on the ecosystem. Forests and land are overexploited and the National Environmental Office has estimated that forests in the region could disappear within less than a century due to an annual deforestation rate of upwards of 10%. This is also compounded by the practice of tavy, common in at least 60% of communes, with very little reforestation to compensate. Deforestation also results from the use of fuelwood (90% of households in the area).
143. Despite a few ad hoc initiatives by local NGOs to rehabilitate the coastal environment, there is no large scale, systematic investment in the ecosystem as a productive and

protective asset for the communities, and there is no consideration of the value of ecosystems in the development and enforcement of land use plans and development plans.

144. At the local level, the region is characterized by large agricultural potential, but low exploitation, except in the case of coffee, which represents 40% of total national production. Fruit trees, pepper, spice, as well as the traditional crops (rice, cassava, maize), occupy the rest of the cultivated areas. Since 2003, productivity has steadily declined in all parts of the region.
145. Additional details on the ecosystems in each region can be found in Appendix 15 in the thematic report on Ecosystems that was prepared during the project design phase. Detailed assessments of livelihoods and modes of natural resource use can also be found in Appendix 15, in the thematic report on Livelihoods.

#### *Degraded and inadequate coastal protection infrastructure*

146. In addition to the degradation of ecosystems, the existing coastal protection infrastructure, such as sea walls, sea defense systems, groynes, dikes and other structures, are all becoming increasingly degraded due to aging and lack of proper maintenance. With the intensification of sea level rise, storm and cyclonic activity, particularly on the East Coast, these infrastructures are likely to prove increasingly inadequate in ensuring the basic protection of coastal cities and settlements.
147. In Antsinanana, Tamatave presents a significant degree of risk, with erosion now threatening Madagascar's largest marine port (70% of port traffic). Some 4 km of protective infrastructure were built in 1997, consisting in a reinforced concrete wall, which have shown good resistance to cyclonic activity. However, it was insufficient to halt sedimentation in the areas closer to Toamasina. There is a partial rock protection wall near Tanio point. These structures, however, provide only partial cover, and are likely not to withstand increased pressure. There is a planned project concerning the rehabilitation of the border of Toamasina city, between the beach and Ratsimilaho, between the hospital bridge and the nautical club. The National Association for Environmental Protection and Development (ANaED) has gathered a few donors and is seeking additional funding to complete the initiative, which is estimated at 160 000 US\$.
148. In Vatovavy Fitovinany, some groynes were constructed during the 1980s to protect the left back of the estuary, which were supposed to slow down the speed of siltation in the estuary, and to limit the need for dredging in the canals and rivers mouths. When they are operational, such systems have been deemed effective. However, the groynes are now degraded as a result of human and natural pressures (a large flood destroyed a part of the system). A part of the protective wall built in 1945 still remains, but that covers only a small area of the coast in front of a private hotel. Areas around Manakarabe are still exhibiting severe degrees of erosion, placing housing, commercial buildings, and administrative buildings at risk. There are no ongoing or planned initiatives related to infrastructure in the area.
149. In Boeny, in the capital city, the Poincaré Boulevard exhibits severe degradation where it borders the sea. Some of the stonework has collapsed, leading to a partial caving in of the road. This was exacerbated by the Gafilo cyclone, which led to further structural damage. Emergency works served to perform immediate repair, however the structure is permanently damaged. Many of the rock groynes along the coast are also partially

collapsed, along a 600 m stretch from the La Piscine Hotel to the culvert. It appears that the structure along the Boulevard is being degraded from underneath. The only rehabilitation initiatives underway in the region are located around the major ports of the region, namely Shneider Port, which is under repair.

150. In Menabe, the only defensive structures are concrete groynes, whose purpose is to slow erosion between the Bethania pass and the north of the city of Morondava. Other, smaller rock groynes have all been degraded or disappeared. Some of the groynes composed of corrugated steel sheeting have been dismantled by sea action, and only those that combine concrete and steel sheeting have survived, although they show significant sand accumulation along the south face of the system. There are no current initiatives to rehabilitate any of these infrastructures.
151. Details on the state of infrastructures and settlements in each region can be found in Appendix 15 in the thematic report on Infrastructure and Technologies.

*Inadequate consideration of climate change adaptation measures into sectoral and development policies*

152. In the context of the coastal and marine policy contained in the Second Environment Programme, a few pilot actions were implemented in touristic sites, such as Nosy Be, Sainte Marie and Fort Dauphin. However the implementation of the policy remains theoretical in most other regions. The ICZM policy and strategy also remains theoretical in three of the four regions concerned by this project, despite the urgent needs to create integrated planning frameworks that can help resolve competition over resources between the different sectors.
153. Local and regional planners lack the capacity to undertake adequate analysis of the costs and benefits of environmental degradation in their areas of jurisdiction. Environmental issues and climate change challenges are not taken into consideration when developing policies, action plans and programs, and as a result, public and private funds are directed at development strategies that are unsustainable and anti-resilient. Skills, knowledge, methodologies and decision-making tools are urgently needed to develop the institutional and individual capacity to integrate these issues, under the umbrella of ICZM, into normal practice of development planning at all levels.
154. In addition, some regulatory frameworks and key texts governing the use of coastal resources are outdated and inefficient. The fisheries laws and regulations do not provide sufficient consideration for areas in which overexploitation, combined with climate change, would require specific conservation or specific management regimes, as would be the case in the targeted regions. Under the Global Climate Change Alliance Program (GCCA), Madagascar has benefited from targeted support, in the form of a project “Intégration du Changement Climatique dans le Secteur de la Pêche dans la Région d'Androy”, whose purpose is to increase the use of fisheries in semi-arid areas where crop agriculture is highly vulnerable to climate change. This project, however, concerns an area where fisheries are under exploited, and has only begun to assist the development of a methodology for assessing the impacts of climate change on fish stocks in the area. No other similar initiative exists in the regions targeted by this proposed LDCF intervention.
155. Environmental Impact Assessment tools and practices do not consider the impacts of climate change on the coastal zone and on proposed infrastructural investments, leading to

a missed opportunity for climate proofing coastal development. The law on protected areas, in addition to lacking specific tools for its application, also does not consider aspects of climate change and its impacts on existing and new protected areas. More specifically, the law on Protected Areas does not specify how management regimes can be adapted to climate change, particularly in PAs where communities still reside and derive livelihoods from natural resources. A new UNEP GEF project is proposing to address some of these issues (under development, at PIF stage at the time of writing), but it does not explicitly, at this stage, integrate issues related to resilience and community adaptation in PAs.<sup>50</sup>

156. Major ongoing relevant initiatives that are addressing baseline problems include the following initiatives, implemented through the Ministries of Agriculture and Environment, that are providing co-financing to all three components of this proposed LDCF intervention:
157. The International Fund for Agricultural Development (IFAD) is also supporting the **Programme of Support to the Development of Menabe and Menaky (AD2M)**. This programme, started in 2006 and slated to end in 2014, has a total budget of 21 million US\$. Its aim is to strengthen the policy and institutional and regulatory processes regarding land tenure security and rights to land at national level and in the two targeted provinces. It also promotes the sustainable use of natural resources, capacity building for local governance including the development of regional, communal and local development plans as well as the emergence of local-level capacities and entrepreneurship. The AD2M program has worked to develop capacity on land tenure, land titling and tenure security through technical assistance and training. Furthermore, the program assisted the Menabe region in developing and implementing its Regional Development Plan (PRD) as well as communal development plans (PCD) in light of the Madagascar Action Plan. In its second component, the program provided investments to reduce Fokontany (village) isolation by creating access roads, and to provide increased access to water for irrigation. This was accompanied by investments in the rehabilitation of watersheds, such as soil restoration and erosion control, agroforestry, rangeland rehabilitation, and reforestation. This program addresses key baseline issues such as watershed degradation and rural poverty in areas situated just above the coastal districts where the proposed LDCF project will intervene (Belo-Tsiribihina). The program also provides direct support for regional level capacity on which this project will build. It does not, however consider aspects related to climate change and the Regional and Communal Development Plans it has contributed to develop run the risk of being jeopardized by climate change and climate variability. The LDCF project will therefore add a resilience component to this program. The AD2M program is providing US\$ 500,000 in co-financing to this LDCF initiative.
158. On the east coast, IFAD, along with other partners (e.g. FAO), is supporting another initiative, the **Rural Income Promotion Programme (PPRR)**, which has the aims of improving small producers' access to markets by strengthening commodity chains, and helping them to capitalize on their produce through partnership contracts. The program creates partnership poles between producers/transporters/processors and traders, and seeks to increase the income and food security of the rural inhabitants of Antsinanana Region (Toamasina area), 87.9% of whom are poor, and to enhance the ability of communities to take charge of their own development. The program, implemented through a loan of US\$ 14.5 million, and an OPEC contribution of \$7.7 million, was set to end in 2013. The program worked in 4 districts and focused on the value chains of capsicum, honey, rice,

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<sup>50</sup> Strengthening the Network of New Protected Areas in Madagascar, under the Biodiversity Focal Area.

maize, fish and litchi, working to create producer partnership poles to enhance market access. This program has contributed to creating a baseline of market organization on which the LDCF project can build, particularly as regards the commercialization of products derived from improved or alternative livelihoods. This project is providing US\$ 3,500,00 in baseline co-financing towards this initiative.

159. IFAD is also supporting another baseline intervention which is active, among others, in the Vatovavy Fitovinany region and which provides a baseline of agricultural production capacity on which this LDCF project can build. The program, which costs \$ 46.6 million, is scheduled to end in 2014, with a new phase tentatively planned thereafter. The **PROSPERER** program works with the Ministry of Agriculture and the agricultural private sector to assist in the creation and emergence of sound business development services that respond to the needs of small and micro rural enterprises. The program works with individual producers and businesses to identify their individual requirements. The programme also assists in structuring traditional clusters into modern value chains – by line of business, to enable long-term sustainability and market expansion – with linkages to regional growth poles. The program works with 27 500 rural micro-enterprises, including in four districts of the province, one of which is directly concerned by the LDCF intervention (Manakara, Mananjara, Ifanadiana, Vohipeno). Therefore the program creates basic production capacity on which the LDCF project can build for its work with local communities, as well as a body of knowledge and expertise among the agricultural stakeholders on the most effective and economically profitable livelihoods. The program does not, however, include elements of climate change or climate variability. The PROSPERER program is providing \$1 million in co-financing to this LDCF initiative. Depending on the outcome of future programming frameworks within IFAD, additional co-financing may be mobilized during the implementation of the project.
160. This project also builds on a solid baseline of ongoing initiatives implemented by the Ministry of Environment and Forests, at the national as well as regional levels. These include the following programs, that make up the MEF's co-financing contribution to this project:
161. **Management and Conservation of Biodiversity.** The MEF works actively, through national and international financing, to protect Madagascar's unique biodiversity. Efforts led by the MEF in this regard include the categorization of at-risk biodiversity, and the management of ecosystems and species through the establishment and management of National parks and Protected Areas. This aspect also includes conservation awareness raising, the development of ecotourism and the monitoring of ecosystem services on which this project will build in the four targeted regions. Specifically, the monitoring of ecosystem services and ecological integrity will provide a useful basis at the regional level, on which this project will build in Component 2. Existing data and information on biodiversity will also be valuable information on which to conduct the study on cost effectiveness of proposed alternative livelihoods, and will also support the monitoring of ecosystem resilience. While the project will not work in or around protected areas, it will develop practices for co-management that are in line with those put in place through the Protected Areas system in Madagascar. Through interventions at national and regional levels, this program provides US\$ 480 000 in baseline co-financing to the proposed ACZM initiative.<sup>51</sup>

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<sup>51</sup> Please note this does not include any amount received by the GEF for biodiversity conservation initiatives.

162. **Forest Management, Protection and Inventory.** The MEF's Direction Générale des Forêts works to provide census information on the types of forests in Madagascar, mapping services, characteristics of their species and use, measures rates of deforestation, and seeks to develop initiatives with local communities on the conservation of forests on which this project will build in the selected sites, by using MEF established methodologies for co-management. The DGF participates actively in the development of REDD efforts in the country. Through its ongoing efforts to monitor and conserve forests in coastal areas, the Forestry Program contributes an estimated US\$ 1 000 000 in co-financing to the proposed ACZM initiative. The project will build on practices and mechanisms established by the DGF for the community-based management of forests in order to devise appropriate forest conservation, mangrove conservation and management arrangements in project sites. Ongoing DGF efforts to monitor and track deforestation also create a baseline of information on which to measure project benefits. In addition, the **Fire Alert System** implemented by the Ministry will also contribute an additional US\$ 200 000 in co-financing to ensure that coastal forest management takes fire risk into consideration.
163. **Natural Resources Knowledge Management.** The Ministry of Environment, through its Direction of Environmental Integration, is working actively to gather and disseminate knowledge, data and information on natural resources in the country. To this effect, the Ministry has created a service of databases and a dedicated documentation service. This initiative will provide support to the efforts of the ACZM project to create ICZM committees regionally, by equipping them with adequate information, and by proposing mechanisms for regional-national linkages. This knowledge management function is also at the heart of mainstreaming efforts, and will serve as a support function to efforts to integrate adaptation in ongoing development planning at national and regional levels. The co-financing contribution from this initiative is US\$ 300 000.
164. **Management and Control of Pollutions.** The Ministry works through its regional directorates and at central level to monitor and control pollution at all levels. This includes marine pollution, in particular through the administration of the Law on Pollution by Hydro-Carbons, as well as land-based marine pollution in accordance with prevailing laws. The Ministry also works to control the management of chemical substances through the Strategic Approach to International Chemicals Management (SAICM) initiative, and also works on waste management issues in conjunction with regional administrations.<sup>52</sup> This program provides a baseline on which the ACZM initiative will build, namely by ensuring that rehabilitated ecosystems remain pollution-free, for a more sustainable maintenance of ecosystem services. The co-financing from this program is estimated at US\$ 600 000.
165. **Environmental Dashboards.** Through the Office National de l'Environnement (ONE), the Ministry is working on the development of environmental dashboard, which are comprehensive environmental information systems that are published periodically for each region. These dashboards provide data and information on key environmental indicators, to enable the monitoring of progress on environmental services and conditions. The Environmental Dashboards developed by the ONE for each region will provide raw data and information to support the development of ICZM adaptation plans, as well as for the establishment of a coastal monitoring system foreseen by this proposed ACZM initiative. Environmental Dashboards are renewed periodically, and so will make a valuable baseline contribution to the monitoring of environmental resilience as it progresses throughout the

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<sup>52</sup> This includes solid and liquid waste collection, water treatment, sanitation and pollution control.

project. The co-financing contribution from this initiative is US\$ 800 000 in the four regions for the duration of the project.

166. Finally, this project will naturally build on the Government of Madagascar's own national development baseline investments, namely on the operations and programmes of the Ministry of Environment and Forests, and other sectoral ministries who are called upon to intervene in coastal area issues, such as the Land Use Directorate, or the Ministries in charge of agriculture, water, energy and transport. For 2013, the combined operational and investment budget of the Ministry of Environment and Forests was set at US\$ 25 million, and expected to remain similar in 2014. Of this amount, the Ministry of Environment and Forests is providing \$ 2.17 million in in-kind co-financing, which corresponds to infrastructure and assets at regional level and staff time contributions to the project at regional and national levels. The Ministry of Agriculture is also providing \$ 500,000 in kind co-financing to the project as well.
167. At the regional level, this project also builds on other ongoing baseline initiatives supported by UNEP. UNEP will bring US\$ 500 000 in co-financing from the UNEP-European Commission ENTRP Project on '**Building Capacity for Coastal Ecosystem-based Adaptation in Small Island Developing States (SIDS)**'. This project seeks to assist countries and regions develop and apply ecosystem-based adaptation approaches to maintain and enhance the resilience of tropical coastal ecosystems and the services they provide to coastal communities in SIDS. Through the project's geographical focus on SIDS in Africa and the Caribbean, the project contribute parallel co-financing through some of the planning and ecosystem management tools and technical guidance to assist decision-making, as well as through regional capacity-building and global transfer of good practices and experiences gained, particularly where mangrove management is concerned.
168. The project can also build on US\$ 500 000 of co-financing from the ICZM protocols under the Nairobi Convention. The development of ICZM Protocol to the Nairobi Convention aims to promote the use of ICZM approaches for long-term sustainable development of the coastal and marine environment in the WIO region, and to strengthen the application of ICZM tools. The support received by Madagascar in this context includes the development of pilot projects on ecotourism as well as support for participation in the protocol negotiations.

## 2.8 LINKAGES WITH OTHER GEF AND NON-GEF INTERVENTIONS

169. During its inception period, the project will undertake renewed consultations at the regional level to identify new or planned initiatives with which to coordinate. It is anticipated that a larger number of development partners and NGOs will begin working in Madagascar again once political situations become more stable. Following are a few of the projects with which this LDCF initiative will seek cooperation:
170. The **Support Programme for Rural Development (SAHA)**, supported by the Swiss Government since 2000, and which, in its newest phase, has evolved into a new program, the MATOY, which is active in the Menabe region. This programme aims to enhance the living conditions of rural communities through interventions in rural zones. The programme's current phase is budgeted at 6.4 million CHF, or 7.2 million US\$. In its third phase, which lasts until 2016, the programme seeks to promote activities designed to create economic productivity and employment around the major economic avenues and product chains, promote land tenure security, and develop the communal investment capacity. The

programme continues the first and second phases efforts to promote the strengthening of local institutions, namely the communal services in their work on land tenure and property reform, tax collection and decentralization. In its second phase, the programme provided core support to the Direction d'Aménagement du Territoire (land use planning directorate).

171. **The Tilapia Aquaculture Project in Mahajanga (Boeny).** This project will provide methodology, technical support and information to the LDCF project when considering the development of alternative livelihoods practices in coastal communities (Component 2). The project is set to end in 2014, and efforts will be made to gather lessons learned and best practices from JICA and local partners.
172. **The German Malagasy Environmental Programme.** This program, in its current version, provides support to non governmental stakeholders from the forestry and environmental sector, including civil society groupings, associations and the private sector. The intention is to strengthen their capacity to contribute to better formulated and better implemented policies for the sustainable use of natural resources. The program also intervenes to build expertise and resources of municipalities and non governmental stakeholders with respect to the sustainable management of local natural resources. This program, which is scheduled to end in 2014, will also provide useful lessons on decentralised environmental planning and management.
173. The project will also collaborate with planned projects such as the **GEF AFDB “Enabling Climate Resilience in the Agriculture Sector in the Southwest Region of Madagascar”**, which is under preparation at time of writing. This initiative seeks to implement projects related to water management and health and can provide useful avenues regarding resilient livelihoods in the western part of the country. The project will also coordinate with the UNEP/GEF initiative, also under preparation, **“Participatory Sustainable Land Management in the Grassland Plateaus of Western Madagascar”** whose goal is to reverse land degradation and improve living conditions in the Bongolava Region of Western Madagascar through participatory sustainable management of the grasslands. The project will work closely with the new project **“Strengthening the Network of New Protected Areas in Madagascar”**, which is being put forward for GEF financing through UNEP, particularly as regards the modification of the Protected Areas law and regulations and their application in the four targeted regions of this LDCF initiative, as well as the proposed mangrove rehabilitation in Menabe, Boeny and Melaky.
174. Linkages will also be sought during implementation with the efforts to support the Malagasy government in the development of a National Adaptation Plan (NAP). This effort, supported by GEF, UNDP and UNEP through a Global Support Program, will benefit from activities in this project towards the design of regional coastal adaptation plans, that can serve as a basis for a NAP. In addition, the project will also contribute towards longer term adaptation planning needs in Madagascar and can liaise with the LDCF-funded Global Support Programme for Assisting LDCs with country-driven processes to advance National Adaptation Plans (NAPs), jointly implemented by UNEP and UNDP.
175. Finally, the project will also establish linkages with the Adaptation Fund (AF) supported project **“Adapting to Climate Change in the Rice Sector”**, which is under implementation until 2017. The project, which is also implemented through the Ministry of Environment and Forests, will be able to contribute knowledge, data and climate predictions, as well as methodologies that can be of relevance to this proposed LDCF initiative. In addition, the MEF’s capacity as executing partner at national level has been

built through the AF project, which will serve to create stronger capacity to implement this initiative.

176. The project will link with the **UNEP LIVE** <http://www.uneplive.org/> portal, launched in January 2014. It is a UNEP initiative that offers a cutting-edge, dynamic new platform to collect, process and share the world's best environmental science and research. It provides a single gateway to accessing and locating country-level statistics as well as providing access to Satellite/Space Programmes such as GEOSS Portal, Earthnet Online, USGS Earth Explorer, as well as an In Situ Programme called Argo. This portal will provide data access to both the public and policy makers using distributed networks, cloud computing, big data and improved search functions with the objective of filling gaps between data providers and consumers. It includes Communities of Practice that gather experts in various fields relating to the environment and bring them on a common platform that provides access to discussion and exchange. UNEP LIVE will also support streamlining of national monitoring, reporting and verification of data for global and regional environmental goals. In the further development of UNEP LIVE, this project will collaborate with UNEP LIVE and present it at various trainings as a means of accessing up to date environmental information and statistics.

### **SECTION 3: INTERVENTION STRATEGY (ALTERNATIVE)**

#### **3.1 PROJECT RATIONALE, POLICY CONFORMITY AND EXPECTED GLOBAL BENEFITS**

##### **3.1.1 Rationale**

177. Madagascar's coastal zones are vulnerable to: i) changes in rainfall levels and patterns; ii) rising temperature; and iii) sea level rise associated with increased frequency of climate hazards such as severe rainfall events, floods, storms and cyclones. This vulnerability is exacerbated by anthropogenic practices such as deforestation for fuel wood and agricultural expansion and the inadequate coastal planning processes, as well as other root causes of vulnerability such as poverty, high population density, reliance on rain fed agriculture, inadequate policy and legislation to address climate change issues. Unfortunately, Madagascar does not have sufficient capacity to cope with these climate change events. This will continue to be the case unless timely adaptation interventions are implemented.
178. This project proposes to tackle this problem through an emphasis on strengthening coastal adaptive responses at the ecosystem, infrastructure and institutional levels in order to reduce vulnerability and contribute to current national efforts to develop appropriate and effective adaptive capacity at all levels.
179. Specifically the project interventions will consist of: i) a strengthening of scientific and technical capacity towards adaptation in coastal zones; ii) the implementation of key adaptive measures and technologies in vulnerable sites iii) and the creation of an enabling policy environment towards stronger coastal resilience.

##### **3.1.2 Policy Conformity**

180. The project addresses the 1<sup>st</sup>, 6<sup>th</sup> and 7<sup>th</sup> priorities identified under the NAPA related to coastal protective infrastructure and ecosystems (dikes, protective walls, groynes, mangroves, dunes), as well as priority 3 on the development of resilient agricultural options in each region's comparative advantage.

181. The project is in harmony with a number of national policy instruments such as the Madagascar Action Plan, which is the third and current PRSP, in accordance with the national vision “Madagascar *Naturellement*” and the UN Millennium Development Goals, as well as the National Environmental Action Plan and the National ICZM Action Programme. In addition, the project is also consistent with the objectives for development expressed in each region’s Regional Rural Development Program.
182. Moreover, the project addresses Priority Area 4 of the UNDAF: “living conditions and productivity of populations is improved”, in particular through contributions to expected result 4.2 “the environment is protected in an around targeted protection areas”. The project also contributes directly to intended result 1.6 “socioeconomic decisions are based on improved information systems and effective planning, monitoring and evaluation frameworks” and expected result 2.2: “populations, in particular vulnerable groups, have access to sustainable income generating activities and employment”.

### **3.1.3 LDCF Conformity**

183. In line with guidance and eligibility criteria for the Least Developed Countries Fund (LDCF), this proposal is requesting LDCF funding for a Full Sized Project (FSP) in order to implement the priorities identified in the NAPA as they relate to the coastal zones. Madagascar ratified the UNFCCC in 1999 and the Kyoto Protocol in 2003, and is classified among the non-Annex I Parties and as a Least Developed Country. Madagascar submitted its NAPA in 2007 and is therefore entitled to benefit from the LDC Fund for the implementation of priority measures identified in its NAPA, all of which comply with the LDCF eligibility criteria. This will be Madagascar’s first LDCF funded project to support the implementation of its NAPA.
184. The project was developed in line with the current LDCF and UNEP guidelines, and fits within the framework of the Programming Paper for Funding the Implementation of NAPAs approved by the GEF Council. Moreover, it conforms with the three principles of the LDCF in the following manner:
185. Country drivenness: the project falls within the framework of the MAP and the ICZM Action Program. In addition, it is in line with the goals and needs of several Ministries such as the Ministry of Environment, the Ministry of Agriculture, the Ministry of Water as well as the priorities highlighted in the Regional Rural Development Programs for each targeted region.
186. Implementing NAPA priorities: The NAPA was prepared in conformity with the guidelines prepared by the Least Developed Countries Groups of Experts (LEG). It identifies 15 priority projects classified as urgent and immediate, of which 3 have a direct bearing on the coastal zone, and another 3 are related to sectors of relevance in the coastal zone. The coastal zone is identified in the NAPA as well as in the National Communications as a particularly vulnerable area. This project seeks to implement at least 4 of the NAPA priority projects.
187. Supporting a learning by doing approach: The project will use pilot activities to show how interventions that combine infrastructural investments with ecological and socioeconomic investments can create a critical mass of behavioural change in the coastal zone that can help reduce vulnerability. The project will also help build scientific and technical capacity through a learning by doing approach, combining training with the delivery of specific

products or work programs. The project is designed to complement other ongoing and planned projects and programmes without duplicating them and to build on the existing systems in place.

### 3.1.4 Overall GEF Conformity

188. The project has been designed and will be implemented to meet GEF requirements in terms of:
189. **Sustainability:** The project has been designed to have a sustainable impact, at community, and at national level. The impacts will include sustainable ecological restoration as well as the rehabilitation or construction of protective infrastructure, combined with measures designed to provide sustainable livelihoods, to reduce pressure on environmental services, and to restore said environmental services in a durable way. See section 3.8 on sustainability below for more details.
190. **Replicability:** The project is to be implemented in four varied regions of the country, so that lessons learned can be extrapolated for future application in other coastal areas. Demonstrations and training will be implemented so as to deliver durable increments in capacity that can be used in the same regions or elsewhere to upscale adaptation measures. Furthermore, the project includes the development of a knowledge and policy building strategy so that adaptation lessons and knowledge can be further integrated into the development planning processes.
191. **Monitoring and Evaluation:** The project has an in-built, effective and well-resourced M&E framework, that will not only ensure that project implementation is as planned, but also provides information through regular progress reports for necessary corrective actions and adaptive management decisions to be taken, and for lesson learning to take place.
192. **Stakeholder involvement:** The project was designed in a participatory manner to ensure significant stakeholder inputs, and will be implemented in a way to ensure their full participation in all implementation aspects including monitoring and evaluation. Consultations and participatory exercises are planned to take place throughout the project so as to ensure continued buy in and feedback from local populations and stakeholders.

## 3.2 PROJECT GOAL AND OBJECTIVE

193. Goal: The goal of the project is to reduce the vulnerability of the coastal zone of Madagascar to adapt to the adverse effects of climate change.
194. Objective: To reduce vulnerability of the coastal zone to climate variability and change through institutional capacity building, concrete coastal adaptation interventions and integration of climate change into policy and planning.

## 3.3 PROJECT COMPONENTS AND EXPECTED RESULTS

195. Project activities are presented below under three interlinked components as follows:

### 3.3.1 Component 1: Institutional capacity development in four project regions

196. Activities under this component are aiming towards the achievement of strengthened institutional capacity to address climate change among key regional stakeholders. This capacity requires the development of science-based targeted knowledge on the specifics of climate vulnerability in each region, which will be achieved through the deployment of participatory vulnerability assessments in each of the four regions, using scientific methodologies such as Dynamic and Interactive Vulnerability Assessment (Coast)<sup>53</sup> or those provided under the UNEP Programme of Research on Vulnerability, Impacts and Adaptation (PROVIA). These assessments will be supplemented by the downscaling of climate models for the east and west coast as well as the development of maps of inundatable zones and the deployment of crop model outlooks for each of the four regions. This will create a knowledge base that will help inform planning processes.
197. In addition, component 1 will also include the creation or strengthening of ICZM coordination mechanisms at the regional level, so as to ensure the appropriate integration of adaptation measures, as identified through the science base above, in the appropriate planning frameworks. These strengthened or new coordination mechanisms will be empowered to undertake resilient planning exercises, on the basis of identified adaptation measures, which will result in regional ICZM based adaptation plans. These plans will in turn be synthesized in a national coastal adaptation plan, with support from the National Committee on Coastal Zone Management (NCICZM). Furthermore, an awareness raising campaign will be deployed parallel to these activities in order to support community based engagement and broader general public awareness and information.
198. The main outcome for this component will be achieved through a series of activities designed to result in three outputs. Output 1.1.1 seeks to identify locally specific risks and vulnerability to climate change; Output 1.1.2 seeks to create coordination mechanisms in each region that can support effective decision-making about coastal adaptation in a context of integrated coastal management; and Output 1.1.3 seeks to use this knowledge and these coordination mechanisms to develop adaptation plans for each region. Together these three outputs contribute to creating stronger institutional capacity at regional level for understanding and addressing climate change impacts.

**Table 4: Outcomes, outputs and indicative activities for Component 1**

Outcomes	Outputs	Activities
1. Strengthened institutional capacity to address climate change impacts in project sites	1.1. Climate change vulnerability and risks for the four coastal regions (Menabe, Boeny, Vatovavy Fitovinany and Atsinanana) are	1. Training for local government authorities on CCA and VA in Coastal Zones and perform 4 CC VRA studies using participatory vulnerability assessment tool DIVA (DINAS Coast) and VIA guidelines (PROVIA), including the identification of potential adaptation measures.

<sup>53</sup> The DIVA model is an integrated, global model of coastal systems that assesses biophysical and socioeconomic consequences of sea level rise and socioeconomic development taking into account coastal erosion (both direct and indirect), coastal flooding (including rivers), wetland change and salinity intrusion into deltas and estuaries as well as adaptation in terms of raising dikes and nourishing beaches. The first version of the DIVA model was developed as part of the DIVA Tool in the EC funded project DINAS COAST (Dynamic and Interactive Assessment of National, Regional and Global Vulnerability of Coastal Zones to Climate Change and Sea Level Rise).

(Menabe, Boeny, Vatovavy Fitovinany and Atsinanana)	identified.	1b. Complete an assessment of CC impacts to coastal ecosystems and their services for the four regions.
		2. Perform downscaled climate scenarios using data available from the National Communications and National Met service, for the east and western coastal zones.
		3. Establish a map of inundatable zones in 4 coastal regions.
		4. In service training on and development of a production systems outlook for 2050 for the top non-rice agricultural value-chains in each region: fisheries, cassava, peanuts, banana.
	1.2. A coordinating mechanism for climate change adaptation is established in project sites (in Menabe, Boeny, Vatovavy Fitovinany and Atsinanana)	5. Create a coordination mechanism (in Boeny, Vatovavy Fitovinany and Antsinanana) for adaptation and ICZM at the regional level building on existing coordination platforms (including national ICZM platform); integrate adaptation issues into the existing coordination mechanism in Menabe.
	1.3. Comprehensive adaptation plans developed for four coastal regions (in Menabe, Boeny, Vatovavy Fitovinany and Atsinanana).	6. Identify recommended adaptation actions at regional level on the basis of activities 1, 2, 3 and 4.
		7. Develop 4 regional ICZM strategies, inclusive of coastal adaptation plans, in a participatory manner through the coordination mechanisms established in activity 5.

### 3.3.2 Component 2: Coastal rehabilitation and management for long term resilience

199. Component 2 will include activities designed to demonstrate the combined and cumulative value of investments into the rehabilitation of coastal infrastructure, environment and livelihoods. The component will include demonstration of a set of mutually reinforcing investments in the four regions whereby urgent and immediate threats to the coastal zones will be addressed through a combination of targeted infrastructural works (rehabilitation or construction of existing sea walls, dikes, groyne systems) and environmental rehabilitation works (rehabilitation of mangrove, community-based reforestation and shoreline revegetation), which will be adjacent to the infrastructural works and serve to halt or reverse the severe coastal erosion trends that some regions are exhibiting. Long term benefits for communities and the environment will be generated through the use of ecosystem rehabilitation and the restoration of coastal zones. The restored ecosystem services will provide a durable basis for long-term socioeconomic development.
200. In parallel and in support to this, communities will benefit from demonstrations of alternative or improved resilient livelihoods that will not only support their income but also

help to alleviate human induced pressures on the coastal environment, namely mangroves and coastal forests). These will include improved crab culture and processing methods; modified fishing and shrimping calendars that take into account new climate parameters, spawning and breeding times to avoid overfishing; improved agricultural practices, including crop diversification, that reduce the need for land clearing and mangrove deforestation but generate resilient income and food production; and alternative economic sources of livelihoods, such as develop plans investment plans with communities on nature-based ecotourism. The project will undertake a participatory study on the cost effectiveness, gender dynamics and resilience of proposed alternative livelihood activities, in order to ensure that risk averse communities will benefit from the most adapted investment support possible.

201. In addition, the project will also support the development of a methodology for measuring coastal ecosystem services (productive and protective) in order to further inform future ICZM planning frameworks and future assessments of the vulnerability of the coastal zone. This will also be supplemented by a locally-oriented awareness raising campaign that will focus on sustainable land management and coastal climate change challenges.

**Table 5: outcomes, outputs and indicative activities for Component 2**

Outcomes	Outputs	Activities
2. Restored and protected coastal zone	2.1. Shorelines are rehabilitated through restoration of protective ecosystem services	8. Conduct a participatory study on the cost-effectiveness, gender dynamics and resilience of proposed alternative livelihoods activities.
		9. Replant and rehabilitate a total of 1200 ha of mangroves in Boeny and Menabe (including the cost of preliminary studies).
		10. Undertake shoreline stabilization in a total area of 300 ha along major protection infrastructure and coastal assets (2 km in Toamasina and 1 km in Manakara) (including cost of EIA).
	2.2. Sustainable natural resource use practices and alternative livelihoods introduced in project sites	11. Develop new fisheries calendars with local fishing communities and industries (incl. shrimping) on a pilot basis in two western regions.
		12. Develop community-based natural forest regeneration, including community woodlots, and conservation plans.
		13. Awareness raising among coastal communities on coastal deforestation and sustainable land management.
		14. Introduce improved fish & crab production and techniques (e.g. mariculture) in Mahanjanga II, Belo sur

		Tsiribihina, Mahanoro and Vatomandry Communes of Boeny, Menabe and Antsinanana.
		15. Introduce technologies and assets for promotion of beekeeping in and around mangroves in Bemanonga & Tsimafana communes (Menabe) and Mangatsiotra and Antsary communes (Vatovavy Fitovinany).
		16. Promote diversification of crops and climate-smart agriculture, such as vegetable production, improved crop varieties, improved cultivation techniques in 8 communes in the four regions.
		17. Work with local communities in Boeny, Menabe and Vatovavy Fitovinany to develop investment plans to promote mangrove-based ecotourism, including identification of potential sources of funding for their implementation.
	2.3. Technologies for protection and rehabilitation of coastal productive assets are demonstrated adjacent to restored ecosystems.	18. Construction and rehabilitation of 1 km sea wall in Manakara be (Vatovavy Fitovinany) including feasibility study and EIA.
		19. Restore and complete the existing system of protection combining groyne and sea walls in City of Toamasina (1.1 km), including feasibility and EIA.

### 3.3.3 Component 3: Mainstreaming adaptation measures into national ICZM policies and development strategies

202. Component 3 is designed to ensure that the benefits of the measures implemented in the first two components are taken a step further through an upscaling and mainstreaming strategy. The purpose of the component is to achieve a change in the policy make up of the country that is most conducive to proactive adaptation and that sets in place the conditions for facilitating resilience at the local level. Among the specific activities that this component will support will be the implementation of training programs for policy makers and regional planners on the integration of environmental and climate change issues into legislation and regulation relevant to the coastal zone, as well as a set of training seminars for sectoral planners at the regional level.
203. The project will also support the capacity of non state actors, NGOs and the private sector, to gradually take part in resilience planning. This will include targeted training and

awareness raising efforts to ensure that civil society is represented in adaptation talks at the national, regional and local level.

204. Finally the project will also support the active integration of adaptation issues into relevant development planning, legislative and regulatory frameworks. Specifically the project will support the revision of the Environmental Impact Assessment procedures to include a provision on resilience for planned investments in coastal zones, and revisions to the fisheries and protected areas law, which have been identified as particularly lacking in terms of climate change integration. The project will also support the integration of climate change issues into the next iteration of Regional Rural Development Plans. This will help support the proposed revision to the national ICZM plan.
205. The project will also support the development of a study on replication, upscaling and financing potential, that will identify future opportunities for continued resilience building investments, including through public and private sources of funding.

**Table 6: Outcomes, Outputs and indicative activities for Component 3**

Outcomes	Outputs	Activities
3. Climate change adaptation measures are mainstreamed into national and sectoral development strategies, and in non-state stakeholder actions or planning	3.1 Training provided to increase institutional capacity of government officials to develop resilient standards, legislative instruments, norms and sectoral plans	20. Develop and implement a training programme on integrating environmental and climate change concerns into legislation and regulation for national and regional parliamentarians and district/regional administrations.
		21. Develop and implement a series of sectoral training programmes on climate change adaptation (agriculture, tourism, infrastructure, water, fisheries and forestry).
	3.2 Training provided to non-state stakeholders to participate in adaptation planning and adaptation actions	22. Awareness raising seminars for NGOs on adaptation, ecosystem based adaptation, climate change and development.
		23. Training workshops for private sector on climate change and investment planning (tourism, fisheries).
	3.3 Existing strategies and laws are modified to integrate climate change adaptation with adequate budgetary allocations for implementation	24. Revise EIA rules and regulations to integrate climate resilience and adaptation concerns.
		25. Revise the fisheries law and the protected areas law to take into account the results of vulnerability studies and adaptation measures identified in Component 1.
		26. Revise regional development planning frameworks in 4 coastal regions to integrate climate change resilience and adaptation concerns.

		27. Review and revise the national ICZM strategy and policy, in light of regional strategies developed in component 1, working with the national ICZM committee.
		28. Deploy an outreach and awareness raising campaign at regional and national level (for general public).
		29. Develop a strategy to explore opportunities for upscaling and financing coastal adaptation including through public-private partnership and financing.

**3.4 INTERVENTION LOGIC AND KEY ASSUMPTIONS**

206. The overall goal of the project is to reduce coastal vulnerability by addressing simultaneously the barriers to coastal resilience at the local and regional level: this includes supporting investments in building local institutional and scientific capacity to understand climate change and its impacts, as well as the capacity of local communities to undertake development in ways that maintain ecosystem’s key protective and productive services, while in parallel rehabilitating the ecosystem to restore its productivity, and ensuring the solidity and durability of coastal protection infrastructure.

207. The logic prevailing this project design is that an integrated approach to coastal zone management that integrates climate change provides the best framework for implementing mutually reinforcing solutions in the coastal zones, to address the multiple causes of vulnerability. This project is based on the following key assumptions:

- That the ecosystems targeted by the project remain within a certain margin of productivity and are not completely depleted or degraded. Rehabilitation of ecosystem services will follow best practices in this regard and will seek to build on natural conditions for enhancing ecosystemic productivity.
- That the communities targeted by the project do not use the opportunities provided by the project to expand their encroachment onto fragile ecosystems, meaning that communities commit to protecting the ecosystems that provide their livelihoods, while benefiting from support that will allow them to make better living from the environment.
- That local governments and authorities continue to support the principles of ICZM, as embodied in the recently approved laws and policies, and can create conducive conditions for resilient development, land use and planning at regional and local level.

**3.5 RISK ANALYSIS AND RISK MANAGEMENT MEASURES**

208. A summary of potential risks, the potential consequences of such risks and management measures to mitigate the risks is presented in table 7 below.

**Table 7: Risk Log**

<b>Description of risk</b>	<b>Risk category</b>	<b>Potential consequence</b>	<b>Level</b>	<b>Management response and mitigation measures</b>
Lack of political will to support project	Political	Project failure and/or limited sustainability	Low	This project has been determined as a priority since the publication of the NAPA and there have been great expectations for investments in the development of coastal zones. Regional authorities, local authorities and national authorities have all bought into the project.
Political Instability	Political	Project implementation delays	Medium	There is a risk that due to ongoing political instability, the project could experience delays, particularly if the forthcoming elections lead to further instability at the regional level. The project will carefully monitor the political situation and will ensure that the capacity for delivering the project is built at multiple levels in order to avoid delays.
Limited capacity to effectively tackle all project components	Operational	Inadequate attention paid to components lacking required human resource expertise	Medium	Establishing a robust multi-disciplinary project implementation team supported with additional training if necessary will help mitigate against this risk. In addition a Chief Technical Advisor will be hired to provide technical guidance to the team and quality assurance of the project products. Targeted capacity building will be delivered at national regional and local level at project start.
Extreme weather events	Environmental	Disruption of project activities and damage to project infrastructure	Medium	Coordination will be undertaken with other partners in order to ensure the response and relief interventions are directed towards the pilot communities. Meteorological forecasts will be taken into account during the planning of critical construction phases of hard infrastructure.

Inadequate sensitization of relevant authorities to undertake climate change sensitive policy reforms	Strategic	Limited project impact	Medium	Project activities have been designed to identify information needs and effective sensitization of decision makers, non governmental actors and the general public to minimize this risk.
Poor coordination among the participating stakeholders (government, non government and private)	Organizational	Delays in project implementation	Medium	Clear project management arrangement, participatory and transparent project implementation will mitigate against this risk. A coordination mechanism will be created to bring together all stakeholders at regional and national level. In addition, local technicians will be appointed in each region to act as a focal point and to assist in coordination at local level.

### 3.6 CONSISTENCY WITH NATIONAL PRIORITIES AND PLANS

209. National priorities with regards to climate change events and its multiple impacts are comprehensively taken into account in the NAPA, which itself was developed in a participatory manner and featured priorities and concerns of a variety of stakeholders including rural and urban communities, non-governmental and community-based organizations, the private sector, the scientific community and various components of government. Care was also taken to align the NAPA to the priorities of a number of important national development plans such as the PRSP 1 and Madagascar Action Plan (MAP).
210. As mentioned above, this project provides a clear implementation mechanism for the MAP, the National Environmental Policy and Action Plan, and the ICZM policy and Action program, as well as the number of sectoral policies that are relevant in the context of the targeted communities (water, fisheries, agriculture, urban planning, disaster management). All of these policy instruments pursue a common goal of ensuring sustainable development through a rational utilisation of a limited natural resource endowment. A goal that is also shared and reflected in the policies of several sectors and services such as: agriculture, fisheries, forestry, and that find a particularly synergistic expression in the framework of coastal zone management.
211. Additionally, the project will contribute to the achievement of the MDGs and in particular of MDG 7 (“ensuring environmental sustainability”) and 1 (“eradicate extreme poverty and hunger”) by reducing vulnerability to climate change and ensuring sustained livelihoods in the face of potential climate shocks.
212. At the regional level, the project is also consistent with the priorities enunciated in each region’s Regional Rural Development Plan (RRDP), as follows:

213. The RRDP in Menabe is based on one global priority, the reduction of poverty in rural areas, declined in three specific objectives. The first objective is to improve food security through the diversification of food crops and the increase of processing units at the artisanal scale. The second is to increase household income by diversifying income resources in rural areas, promoting initiatives in rural entrepreneurship, and structuring and strengthening existing value chains. The third objective is to develop production and productivity by making quality seeds and inputs available to producers, as well as improving the dissemination of technical capacities.
214. The RRDP in Vatovavy Fitovinany focuses on six priorities: 1) the implementation of rural infrastructures necessary for the increase of production and improving agricultural productivity; 2) land tenure; 3) the development and sustainable management of natural resources; 4) the reduction of food insecurity; and 5) the promotion of rural entrepreneurship.
215. The Boeny RRDP's priority is to stimulate the rural world and effectively reduce poverty in the context of a green revolution and a thriving agricultural production. To achieve it, the RRDP defines four specific objectives. The first one is the development of five areas of economic potential in order to better exploit the differences, similarities and interdependencies between districts and/or municipalities. The second is the promotion of development centers to generate rapid and sustainable ripple effects in other towns, and secondary centers with specific major potential to reduce rural poverty. The third one is the increase of regional investments in sectors with high added value servicing potential areas and the establishment of institutional incentives. The fourth objective is to promote rural market-oriented economy through the promotion of promising sectors.
216. The RRDP in Atsinanana is based on two main priorities. The first one is to exploit the economic potential of the region and open up municipalities by improving agricultural practices, promoting value chains (litchi, banana, sugard cane, coffee, pepper and pineapple) and creating and developing economic infrastructures (water, land, rail and air transport, telecommunications). The second priority is to reform the management of public administration by decentralization and deconcentration of powers and public services.

### **3.7 ADDITIONAL COST REASONING**

217. In the absence of immediate intervention to ensure coastal resilience in these four highly vulnerable regions, communities and settlements will be at increased risk of degradation and disappearance. The combination of environmental degradation, infrastructure degradation or lack of protective systems, with the increasing human pressures placed on coastal resources, creates an untenable situation in the coastal zone. The additional burden posed by climate change and its manifestations (erratic rainfall, increased sea level and tidal activity, coral bleaching, temperature increases and cyclones) are likely to further exacerbate the already precarious nature of coastal livelihoods.
218. This project will address these combined pressures by intervening at three levels: by building the capacity of local institutions, governments and civil society, to understand and plan for adaptation in a proactive way; by providing urgent investment support in the rehabilitation of degraded buffering ecosystems and in the establishment of adequate coastal protection infrastructure; and by supporting the emergence of livelihoods that are respectful of the natural limits while allowing for increased income and safer settlements.

219. These aims will be realised through the achievement of the following components:

### **3.7.1 Component 1: Institutional capacity development in four project regions**

LDCF Financing: \$579,283

Co financing from baseline initiatives: \$3,380,000

220. Under the business as usual scenario, regions would continue to develop according to unsustainable and unresilient pathways, because they lack the knowledge and the understanding of their specific climate change vulnerability. The breadth of the country would mean that each region would be applying a method or an approach to climate resilience that would be based on false assumptions and national averages which may or may not prove useful at regional level. In addition, without the empowerment of regional and local authorities to understand, analyse and plan for climate change, the country will continue to rely on central government to promote adaptation. This could prove unsustainable if the current political situation continues and if the lack of means of the central government forces it to select among other priorities.
221. There is currently no ICZM framework on which to build a proper regional platform for adaptation in three of the project's targeted regions, while in the fourth, the ICZM structure functions without any consideration of the potential impacts of climate change on key sectors of the regional economy. Left unaddressed, this situation will mean that interventions on the coastal zone will continue to be ad hoc and opportunistic, and that adaptation concerns will remain untackled until they are too urgent to be ignored. Already, many of the key cities and settlements in coastal regions are facing harsh conditions, rapid infrastructural degradation, and difficult livelihoods.
222. Under the adaptation alternative, the project will support the four regions in undertaking a comprehensive and science-based vulnerability assessment according to the methods proposed by PROVIA and DIVA Coast. These methods provide integrated assessment frameworks to determine specific physical, economic and social vulnerabilities and to select adaptation measures that are locally adapted. To support these assessments, the project will also provide support to the downscaling of climate models so that regional climate specificities (east vs. west) can be further detailed and can serve to inform decision-making. To further support decision-making at regional and national level, the project will support the development of crop systems outlooks for 2050, which will provide a portrait of anticipated agricultural conditions, prospective crop growth models, and areas of crop vulnerability in all regions. These crop model outlooks will be performed for the top non-rice crop in each region (or cassava, peanuts, banana), as well as the major fisheries.
223. On the basis of these assessments and models, the regions will then be able to identify a list of adaptation measures (reactive and proactive). To support this exercise, the project will support the establishment of ICZM committees in three regions, whose terms of reference will include climate change considerations. In Menabe, the project will support the integration of climate change issues into the existing mandate and work of the existing ICZM structure. These four ICZM structures will then be empowered to develop regional coastal adaptation plans, which will then be further synthesized, under Component 3, into a national coastal adaptation plan under the aegis of the National ICZM committee.
224. These capacity building efforts will build on the baseline of existing regional planning capacity and, where available, ICZM capacity at regional and national level. The table

below summarizes the difference between business as usual and the proposed adaptation alternative.

<b>Business as usual</b>	<b>Adaptation Alternative</b>
General knowledge of climate change impacts, vulnerability on key sectors and assets	Locally specific and science-based understanding of vulnerability and impacts of climate change on ecosystems and communities
Only 1 ICZM coordination mechanism that doesn't take adaptation or climate change into consideration	Each region has its own ICZM coordination mechanism that takes climate change and adaptation into consideration
No locally specific adaptation options identified or planned	Locally specific adaptation options identified and integrated into regional planning through the development of four regional plans on coastal adaptation.

### 3.7.2 Component 2: Coastal rehabilitation and management for long term resilience

LDCF Financing: \$3,684,220

Co financing from baseline initiatives: \$5,450,000

225. Under the business as usual scenario, the coastal protection infrastructures in major cities of each region will continue to degrade, leading to disruptions, inundations and potential losses of life and property. This will be further exacerbated as the key ecological buffering systems, such as mangroves, dunes, and estuaries, degrade due to natural and human pressures. Communities in coastal communes will continue to live in poverty and to resort to environmental degradation to derive their livelihoods, such as overfishing, mangrove depletion, deforestation, and tavy agriculture. Not only will communities be faced with increasing climate pressures with which they will not be able to cope, but they will continue to degrade the environmental services that provide them with the basic levels of protection and livelihoods. This could result in massive losses of life, migration, and destruction of property, environment and biodiversity loss at large scales.
226. Under the adaptation alternative, the project will work with key communes to address urgent and immediate adaptation needs, while demonstrating livelihoods practices (see table below for more details) that help maintain the ecological basis for survival. Interventions will be coordinated as much as possible, so as to provide a comprehensive package of investments, and to create a set of mutually reinforcing measures. Environmental buffers such as dunes, shorelines and mangroves, will be rehabilitated, and communities will be encouraged to conserve these areas through the provision of alternate sources of food and energy, where relevant. In parallel, priority investments in degraded protective infrastructures will also be supported, so that key economic assets of the region do not fall into irreparable damage.
227. The investments proposed for each region are highlighted in the table below. Each investment is the result of in-depth consultation and prioritization undertaken with the regional authorities and communities, along with discussions on cost effectiveness. Options were selected from amongst the most urgent and most cost efficient from a list of proposed interventions put forward by the regions, which are detailed in the technical studies (see Appendix 15). The physical measures highlighted below are subject to final technical design following environmental impact assessments. In addition, the project intends to

undertake a participatory study on cost effectiveness, gender dynamics and resilience of the proposed alternative livelihoods activities, to ensure that the benefits to local communities will exceed the risks they are taking in adopting these methods.

Business as usual	Adaptation Alternative
<p>Coastal ecosystems in each region continue to degrade at a rapid pace: mangroves disappear due to deforestation, fish stocks dwindle due to overexploitation, coastal forests gradually diminish due to over logging, agricultural land become unsuitable.</p>	<p>1200 ha of mangroves rehabilitated, leading to an increase in productivity of fisheries and increased coastal protection.</p> <p>Coastal forests are placed under collaborative management systems and woodlots are established to relieve pressures on fragile coastal forests and mangroves.</p> <p>Shorelines are stabilized through revegetation to increase stability and protection of major productive assets.</p>
<p>There is no knowledge or understanding of the value of coastal ecosystems. Environmental Dashboards continue to ignore climate change pressures and do not consider the adaptive value of ecosystems</p>	<p>A system is established, building on the Environmental Dashboards, that helps monitor coastal ecosystem services.</p>
<p>Local communities, driven by increasing poverty, continue to use natural resources in an haphazard, unrestrained and unsustainable manner, further contributing to their own impoverishment.</p>	<p>New fishing calendars are negotiated with communities to limit overfishing and degradation of stocks.</p> <p>Alternative and resilient sources of livelihoods are promoted and demonstrated to relieve pressures on fragile ecosystems and declining natural resources.</p> <p>Communities manage forests and woodlots, agricultural lands and biodiversity sustainably.</p>
<p>Coastal protection infrastructures are degraded due to severe events, lack of funding for maintenance and inadequate non resilient design. Cities and settlements are jeopardized by sea level rise.</p>	<p>1 km of sea wall is rehabilitated in Manakara and the groynes and dike system in Toamasina is rehabilitated. Environmental rehabilitation (mangroves and shorelines) provides added efficiency and effectiveness to protective infrastructures.</p>

**Table 8: List of proposed interventions in each site**

	Boeny	Cost	Menabe	Cost	Antsinanana	Cost	Vatovavy-Fitovany	Cost	Cross-cutting costs (studies, impact assessments, knowledge sharing)	Total
<b>Ecosystems</b>										
9. Replant and rehabilitate a total of 1200 ha of mangroves in Boeny and Menabe (including the cost of preliminary studies)	Baie de Mahajamba à Estuaire de Betsiboka: 400ha et Baie de Bombetoka à Baie de Baly : 300 ha	69,000	Communes Tsimafana et Belo sur Tsiribihina (District Belo sur Tsiribihina) : 200 ha - et Communes Bemanonga & Morondava (District Morondava): 300 ha	50,000					25,000	144,000
10. Undertake shoreline stabilization in a total area of 300 ha along major protection infrastructure and coastal assets (2 km in Toamasina and 1 km in Manakara) (including cost of EIA)					City of Toamasina by Analakininina-Hopitaly Be, through the Rabemanjara-Salazama y High School, before Amanalana (2km)	5,600	Along the sea wall, 1km <sup>2</sup>	2,800	8,000	16,400
12. Develop community-based natural forest regeneration, including community woodlots, and conservation plans	Boanamaray & Ampitsopitsoka, Fokontany Amborovy & Antsahanitia	18,000	Belo sur Tsiribihina, Bemanonga & Tsimafana, Morondava,	18,000	Mahanoro and Vatomandry	18,000	Mangatsiotra (15 km south of Manakara) , 50 ha of woodlot and Antsiray	18,000	8,125	80,125

Infrastructures										
18. Construction and rehabilitation of 1km sea wall in Manakara be (Vatovavy Fitovany) including feasibility study and EIA	N-A		N-A				Manakara B, 5m above hydrographic zero and 1km long	1,000,000	200,000	1,200,000
19.. Restore and complete the existing system of protection combining groyne and sea walls in City of Toamasina (1.1km), including feasibility and EIA	N-A		N-A		City of Toamasina by Analakinina-Hopitaly Be, through the Rabemanjara-Salazama y High School, before Amanalana (1.1km)	600,000			100,000	700,000
Livelihoods										
11. Negotiate new fisheries calendars with local fishing communities and industries (incl. shrimping) on a pilot basis in two western regions	Commune Boanamy & Ampitsopitsoka (Mahanjanga II), 2200 beneficiaries	36000	Commune Belo sur Tsiribihina, 2500 inhabitants	36000					10,000	82,000
14. Improved fish & crab production and techniques (e.g. mariculture)	Commune Boanamy & Ampitsopitsoka (Mahanjanga II), 2200 beneficiaries	60,000	Commune Belo sur Tsiribihina, 2500 inhabitants	60,000	mariculture in ( 2 sites with capacity of 32 m3 each) - Mahanoro 1000 beneficiaries, and Vatomandry, 1000 beneficiaries	60,000			16,875	196,875

15. Promotion of beekeeping activities within mangroves			Communes Bemanonga & Tsimafana, 1200 inhabitants	110,000			Mangatsiotra and Antsary (80 households)	110000	7,500	227,500
16. Improved crop techniques & production, diversification, improved crop varieties and techniques	Fokontany Amborovy & Antsahanitia (Mahajanga I), 3000 beneficiaries	165,500	Communes Bemanonga & Tsimafana, 1200 inhabitants	165,500	Mahanoro, Vatomaniry	165,500	Mangatsiotra and Antsary (80 households)	165000	21,000	682,500
9. Development of community based mangrove ecotourism	Complexe Mahavavy - Kinkony (Nouvelle Aire Protégée) / Soalala - Mitsinjo, 1300 beneficiaries	60000	Commune Bemanonga (District Morondava), 1500 inhabitants	60000			Mangatsiotra, 4000 inhabitants	60000	10,000	190,000
<b>approximate total of beneficiaries and total cost per region</b>	<b>6300</b>	<b>408,500</b>	<b>7300</b>	<b>499,500</b>	<b>3000</b>	<b>849,100</b>	<b>4200</b>	<b>1,355,800</b>	<b>406,500</b>	<b>3,519,400</b>

228. In order to better target the activities at community level and to learn from available evidence in terms of economic potential, practicability and in order to further build community engagement, the project will support in its first year, the deployment of a targeted participatory study on cost effectiveness, gender dynamics and resilience of alternative livelihoods in coastal zones in each region.
229. The proposed infrastructure works will be subject to detailed technical design, feasibility and environmental impact assessments which will be subcontracted to the private sector, under the supervision of the Ministry of Environment and Forests, who will ensure that legal requirements regarding EIA are adhered to. These studies are to be completed within the first or second year of the project.
230. The project will also support the deployment of regional awareness raising campaigns, highlighting the challenges of environmental degradation, climate change and the possible adaptation responses available to coastal area communities. The campaign will highlight in particular the need for maintaining coastal buffers such as mangroves and forests and will also use lessons learned from activities deployed under the component.

### **3.7.3 Component 3: Mainstreaming adaptation measures into national ICZM policies and development strategies**

LDCF Financing: \$727,500

Co financing from baseline initiatives: \$2,500,000

231. Under the business as usual scenario, the regional planning frameworks, legislative and institutional instruments available will continue to ignore the realities of environmental degradation and climate change. As a result, maladaptation will ensue, with sectoral planning and development planning at all levels being at odds with the realities of climate change. In a time of difficult transition for Madagascar, scarce development resources need to be invested the most efficiently possible, towards investments that provide sustainability and resilience as well as rapid opportunities for socioeconomic development.
232. Some capacity to address climate change now exists at central level, but sectoral planners and decision makers at regional level are still unable to fully address the challenges posed by climate change. Regional development plans, commune development plans remain unaware of the potential obstacles or opportunities posed by a changing climate.
233. Under the adaptation alternative, the project will support the development of policy capacity by implementing a training programme on integrating environmental and climate change concerns into legislation and regulation for national and regional parliamentarians and district/regional administrations. This will be supplemented by a series of sectoral trainings on climate change adaptation (agriculture, tourism, infrastructure, water, fisheries and forestry) to be deployed for decentralized sectoral planners. This will build on activities implemented through Component 1 on the development of scientific and technical capacities.
234. In addition, in order to engage civil society, and ensure that non-state actors can also effectively engage on resilience issues, the project will implement an awareness raising strategy dedicated to NGOs and the private sector. For NGOs, the project will support capacity building on climate change and coastal adaptation issues, whereas for the private sector, the project will provide targeted training on resilience building in investments, be they construction, tourism, or agro food.
235. To further secure the resilience of investments in coastal regions and elsewhere, the project will also support the Ministry of Environment and Forests in its efforts to update and revise the EIA procedures, so as to ensure that they contain a mechanism by which to consider the impacts of climate change on proposed investments and works. This modification to the EIA regime could provide a pragmatic and far reaching

tool for ensuring the resilience of investments throughout the country, as well as for ensuring that the said investments do not damage ecosystem services that are necessary for resilience.

236. Building on the above activities, the project will help the regional authorities and communal authorities in producing or revising Regional and Communal Development Plans that take climate change into consideration. Taking advantage of the next planning cycle in each region, the project will work through the ICZM structures established in Component 1 to provide input on resilient ICZM for integration into RDPs and CDPs. Where necessary, the ICZM strategies in each region will also be revised or updated in order to include climate change and resilience considerations.
237. Finally, in order to ensure sustainability in the long term, the project will support the development of a strategy for upscaling and financing coastal adaptation including through public-private partnership and financing. This study will include the gathering of lessons learned from the project, including lessons from the monitoring of ecosystem services. This will provide a platform from which to launch a potential upscaling and financing mobilization strategy.

<b>Business as usual</b>	<b>Adaptation Alternative</b>
Capacity to understand and react to climate change is limited to three or four key sectoral ministries at the national level. Initiatives underway target only agriculture and water ministries.	Capacity to assess, understand, analyse and react to climate change is created through training programs.  Capacity is also created among non-state actors (NGOs and private sector) to create a critical mass of awareness.
Existing norms, rules, legislations are inadequate to deal with the impacts of climate change at the national level. Only the Environmental Law takes climate change into consideration. The ICZM policy doesn't take climate change into account.	The EIA procedure is revised to take climate change into consideration  The Fisheries and Protected Areas Laws are revised to account for climate change adaptation  The ICZM policy is revised to ensure integration of climate change into its provisions for application in all coastal provinces.
Regional development plans continue to ignore realities of climate change or adaptation options.	Adaptation measures are integrated into regional development plans.

### 3.8 SUSTAINABILITY

238. The sustainability of the project will depend to a large extent on the willingness of stakeholders to maintain project mechanisms and results beyond the project duration, including the political will towards the implementation of the sectoral strategies proposed by the project. Sustainability will also depend on the learning mechanisms and the extent to which they are maintained throughout the project duration and beyond it.
239. The project will create lasting capacity among individual and institutions in charge of regional planning, which will outlast the duration of the LDCF funding. ICZM institutions are expected to be integrated into the regular functioning of the government, according to current plans, and will therefore last beyond the duration of the project. All tools and methods will be made available to institutions so that the assessments can be further replicated, and technical knowledge and know how remains in the regional administration after the project closes.

240. From a physical perspective, the interventions on infrastructures and ecosystems will be sustainable well beyond the duration of the project. Infrastructure, if well constructed and if integrating climate change data, are expected to last at least 50 years, with proper maintenance. The project will work with the Ministry of Public Works to establish the best technologies for rehabilitating and constructing coastal protection infrastructure, and the proposed interventions will be subject to detailed engineering and EIA studies.
241. The ecosystem level interventions are expected to provide lasting benefits to communities, provided that said communities continue to be able to derive livelihoods sustainably from their surrounding environment. Hence the deployment of alternative livelihoods strategies will provide the mechanisms by which communities can reduce their pressures on ecological buffers, while maintaining economic opportunity. It is expected that the socioeconomic benefits of alternative livelihoods strategies will outweigh the need for encroachment on natural ecosystems. Nevertheless, in order to ensure that strategies proposed are indeed economically viable and profitable, the study on cost effectiveness, gender dynamics and resilience, under Component 2, will provide a more detailed assessment to inform the project.
242. Finally, the integration of project lessons learned into regional development plans, ICZM strategies and commune development plans will ensure that future development endeavours are respectful of the environment and are aware of climate change challenges and opportunities. All of the above measures will ensure the overall medium to long term sustainability of the foundation that will be laid by this project.

### **3.9 REPLICATION**

243. The project seeks to demonstrate a package of replicable interventions applicable to all coastal regions in Madagascar. The selection of four regions is designed to provide examples representative of the various climatic, environmental and socioeconomic conditions in the country. In addition, the project will develop an explicit replication strategy under Component 3, identifying the conditions for success, the lessons and best practices, as well as the potential sources of funding for upscaling.
244. Lessons learned during local level adaptation interventions will be shared with community-based organizations (CBO) and Non-Government Organizations (NGO), government agencies and Ministries through the media and NCC outreach activities so that they could be replicated elsewhere in the country.

### **3.10 PUBLIC AWARENESS, COMMUNICATIONS AND MAINSTREAMING STRATEGY**

245. The implementation of this LCDP project will contribute significantly to improving the knowledge base on vulnerability and of potential adaptive responses to the negative climate change impacts on development. A robust and effective communication and awareness raising strategy will be developed and implemented to ensure the general public is fully aware of this challenge and of the potential solutions to it. A communication and awareness strategy will be developed during the inception phase based on the deployment of awareness raising activities included in each Component.
246. The purpose of the strategy will be to inform stakeholders at all levels and in all relevant social groups about the challenges posed by climate change to coastal development and coastal zone management, and of the potential ecosystem-friendly solutions to it. This will include developing targeted messaging and training for government actors, non-state partners, the media, and the private sector, as well as a comprehensive local stakeholder and community engagement strategy. Activities will include:
- Trainings and participatory Vulnerability Assessment, the creation of multi-stakeholder ICZM coordination platforms and the deployment of an outreach and awareness raising campaign at regional and national level for the general public (Component 1 and 3);

- Trainings and the implementation of alternative livelihoods, community-based natural resources management, forest management and fisheries management schemes and the participatory study on cost effectiveness, gender dynamics and resilience of alternative livelihoods (Component 2);
  - Trainings and awareness raising seminars for NGOs and the private sector on adaptation, ecosystem-based adaptation, climate change and development, and resilient investment planning (Component 3).
247. The project will also integrate efforts to communicate and share lessons with other countries, in particular other small island developing countries, through available adaptation networks, such as the AAKNET, the Global Adaptation Network, WeAdapt, and others.
248. The timing of various communication and sensitization activities will be linked to project milestones such as the inception workshop, launch of various activities, with active participation of the media at national and local level.
249. The project will use a suite of: communication tools (such as newsletters and bulletins; radio and television presentations); policy briefs; print media and scientific publications; as well as community and city hall meetings. Outreach approaches such as: intra- and inter-Ministerial dialogues; seminars and workshops; press conferences and public-private platforms will also be included in this component. The project web page will be used as an important platform to communicate lessons learned and disseminate key messages.

### **3.11 ENVIRONMENT AND SOCIAL SAFEGUARDS**

250. The project will be subject to Malagasy rules and regulations regarding Environmental Impact Assessment. Physical interventions will be subject to prior EIA approval by the Ministry of Environment and Forests. The project has included targeted resources for the development of detailed engineering planning studies for the infrastructure works as well as comprehensive environmental impact assessments for the planned works.
251. Activities designed to rehabilitate degraded ecosystems, while not being subject to EIA requirements, will be conducted under the stewardship of the Ministry of Environment and the National Environmental Office, who will ensure that national norms are respected. Reforestation and the rehabilitation of mangroves will be undertaken using locally available non invasive species, and where possible, species with proven resistance to climate change.
252. Social safeguards will also be applied in accordance with national practice. Local authorities will be fully involved in all activities deployed by the project and local technical assistants will be recruited by the project to ensure that project activities are deployed in accordance with appropriate labour, social, health and other norms. In addition, the project will ensure that all activities are based on preliminary participatory consultations, including where necessary through letters of agreements from representatives of beneficiary communes. The project will not encroach on private land, nor will it intervene in areas where land tenure is an issue. Land tenure issues, should they arise, will be delegated to the Ministry of Land Use Planning for resolution.
253. The project will implement a gender integration and equality strategy through all its activities, including by ensuring adequate participation by women at all levels in the project. At local level, the project will ensure that at least 50% of the project beneficiaries are women and project targets and indicators are disaggregated by gender when relevant. In most regions concerns, female population represents more than 50% of the total, and female headed households are particularly vulnerable. The project will ensure that these groups are explicitly targeted throughout the project.

## SECTION 4: INSTITUTIONAL FRAMEWORK AND IMPLEMENTATION

### Implementing and Executing Agencies

254. This project is in line with UNEP's Programme of Work 2014-2015, in particular with Subprogramme 1-Climate Change . The project will be conducting assessments, undertaking pilot initiatives through Ecosystem-based approaches to Adaptation, fostering climate change outreach and awareness-raising, knowledge-sharing through climate change networks—all of which are areas of work under Subprogramme 1 under the current UNEP Programme of Work (PoW 2014-15). Under the Climate Change Subprogramme the project will be contributing to PoW Output 2 (*Technical support provided to countries to implement ecosystem-based adaptation demonstrations and supporting adaptation approaches, and to scale these up through partnerships at the regional and national levels*) and Output 4 (*Technical support provided to countries to address adaptation planning and reporting requirements under the Framework Convention on Climate Change*), under expected accomplishment A (*Ecosystem-based and supporting adaptation approaches are implemented and integrated into key sectoral and national development strategies to reduce vulnerability and strengthen resilience to climate change impacts*).
255. UNEP will be the Implementing Agency (IA) for this proposed project and will be responsible for overseeing and monitoring the project implementation process as per its rules and procedures, including technical back stopping. It will work in close collaboration with the Ministry of Environment and Forests, which houses the Directorate of Climate Change (DCC), who acts as the Executing Agency for the project. The Executing Agency will be responsible for the achievement of project outputs and outcomes, day to day management and coordination of project activities and inputs, as well as for the reporting on achievement of project objectives. The Executing Agency will be responsible for entering into agreements with other partners, as well as for ensuring that co-financing contributions from the Government of Madagascar and external sources materialize as planned.

### National Project Director (NPD)

256. The Director of the DCC will serve as the National Project Director (NPD). The NPD will ensure a continued cohesion between the project and the mandate of the MEF and provide additional linkages and interactions with high level policy components within the Government. He/she will follow up on, supervise and coordinate the contributions of the Government of Madagascar.

### Project Coordinating Unit (PCU)

257. Project execution will be ensured by a Project Coordination Unit (PCU) comprised of a project Coordinator, a financial and administrative assistant and a Monitoring and Evaluation Clerk. At the regional level, the PCU will be assisted by regional technicians delegated by the regional MEF antenna, who will provide technical support for project implementation.
258. The PCU will also serve as a focal point to coordinate activities between ministries and stakeholders for project implementation.

### Project Coordinator (PC)

259. The project will hire a full time PC who will lead and direct the PCU. The PC will bring in administrative experience and technical expertise in at least one of the disciplines relevant to the project and will be responsible for the day to day execution and management including the financial management of the project and the preparation of all due reports. He/she will be provided with administrative/logistical support staff

assistance. The PC will carry out all of the above functions under the direct supervision of the NPD. In addition, the PC will report to the UNEP Task Manager on progress and challenges during execution.

#### Chief Technical Advisor (CTA)

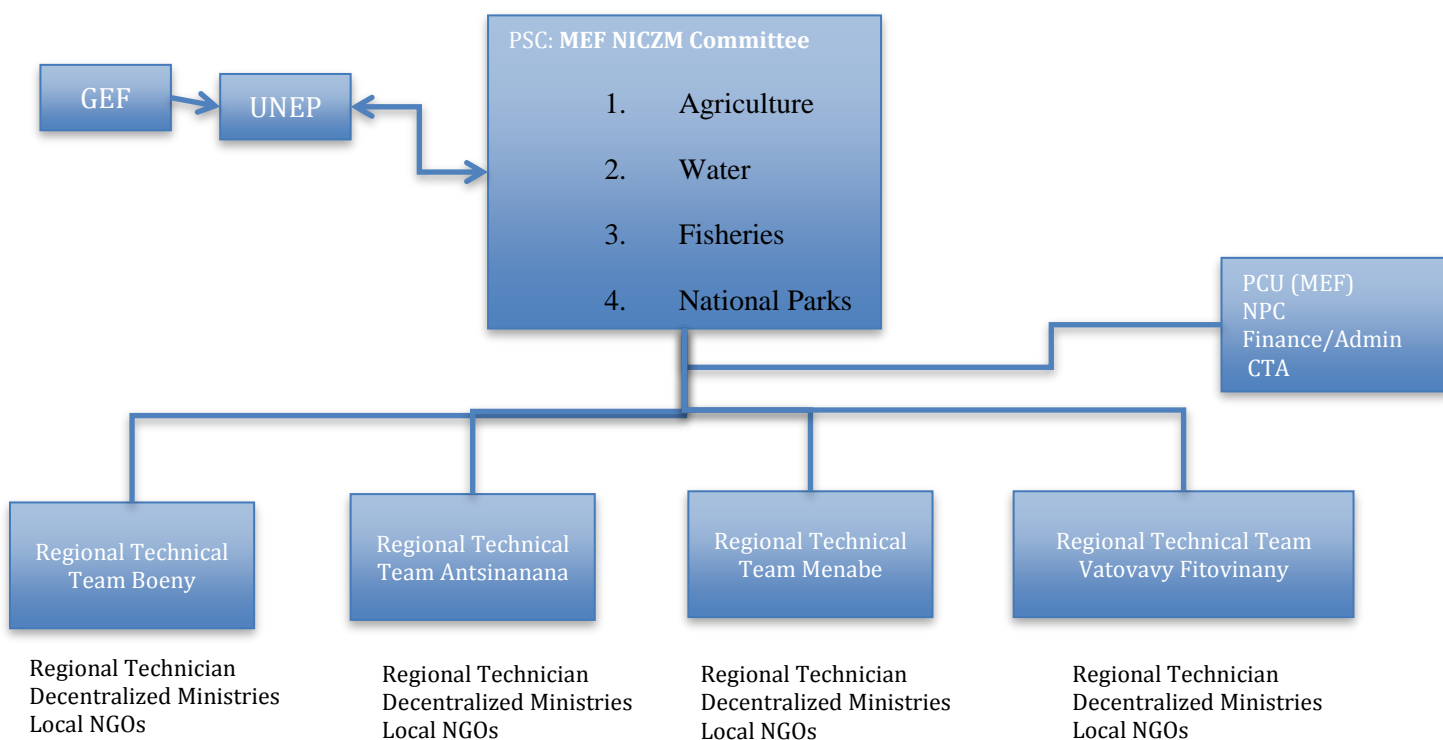
260. A Chief Technical Advisor (CTA) will be hired by the project and will function as a member of the PCU. The CTA will provide the following services: i) quality assurance and technical review of project outputs (e.g. studies and assessments); ii) assist in drafting TORs for technical consultancies and supervision of consultants work; iii) assist in monitoring the technical quality of project M&E systems, including annual work plans, indicators and targets; iv) advise on best suitable approaches and methodologies for achieving project targets and objectives; v) provide a technical supervisory function to the work carried out by other technical assistance consultants hired by the project; and vi) assist in knowledge management, communications and awareness raising. The CTA will report to the PD and will participate in the meetings of the PSC as a resource person.

#### Project Steering Committee (PSC)

261. A Project Steering Committee (PSC) will be appointed at the beginning of the project, and will be chaired by the Executing Agency. The PSC will play an oversight role, and provide support, policy guidance and supervision for the project. Specifically, it will consider, approve and validate the project's annual work plans, budgets and procurement plans, as well as all progress, monitoring, evaluation and final reports. It should be multi-disciplinary and multi stakeholder in its composition to include members with disciplinary expertise required by the project and representatives of NGO, CBO, the private sector, and government institutions and departments such as the Ministries of Water, Agriculture, Fisheries, Environment, Public Works, the Regional and National ICZM committee chairpersons, the Ministry in charge of Finance, Economic Planning and Industrial Development, and representatives from the regional authorities. UNEP will be a full fledged member of the PSC.
262. The expected contribution of the PSC members is to facilitate the implementation of the project activities in their respective agencies as appropriate, and ensure that activities are implemented in a timely manner and facilitate the integration of project inspired activities into existing programmes and practices. The PSC will meet at least once annually and will be expected to review implementation progress and to address any challenges or major changes in implementation plans.
263. Both the PC and the NPD will be members of the PSC with the latter serving as its chair, while the PC will serve as its secretary. The PSC will have the authority to establish subcommittees or Task Teams in order to provide sectoral or thematic guidance to project implementation. Task teams will comprise relevant PSC members as well as technical advisors or consultants recruited through the project.
264. Where necessary, regional coordinating committees will be established at the regional level, to ensure local level coordination and linkages. Regional coordinating committees will be supported by local technicians who will be recruited by the project and who will act as focal points for the project activities in their respective regions, acting as a relay between the PCU and the regional partner institutions. Regional committees will also include, where feasible, representatives of other ongoing projects, so as to ensure continued dialogue and coordination.
265. A Project Managers' Coordination Working Group (PMCWG) will be established to improve the coordination and dialogue between the ongoing projects including the AF one implemented by UNEP. The PMCWG will include the CTA, the managers of the baseline projects and representatives of other aligned projects (see Section 2.8). Meetings for the PMCWG will be held twice a year. They will work towards: i)

promoting synergy between projects; ii) preventing the duplication of activities; iii) optimising the effects of the project interventions; and iv) sharing lessons learned.

266. During the project implementation, the Executing Agency (MEF) will enter on behalf of the project into agreements with other relevant ministries in order to delegate the delivery of sector specific activities, and to ensure the integration of project activities into the program of work of different ministries. As such, infrastructure works will be expected to be carried out under the responsibility and supervision of the Ministry of Public Works, and activities designed to explore and implement alternative livelihoods will be delivered by and through the Regional Rural Development Directorates (MinAg) and its procedures. However, the MEF will remain responsible for the use of resources, and for the application of adequate social and environmental safeguards, including the application of environmental impact assessment requirements.



**Figure 13: Project Management Structure**

## SECTION 5: STAKEHOLDER PARTICIPATION

267. In pursuance of the participatory approach used to develop this project, a detailed stakeholder involvement plan, with specific roles different stakeholder will play during implementation, will be fully developed during the inception phase starting during the project inception workshop and revised annually to reflect project evolution. Indicative stakeholder participation per project output is provided below.

<b>STAKEHOLDER PARTICIPATION</b>		
<b>Project Component</b>	<b>Outputs</b>	<b>Stakeholders and role</b>
1.	1.1 Climate change vulnerability and risks for the four coastal regions (Menabe, Boeny, Vatovavy Fitovinany and Atsinanana) are identified.	Regional authorities, decentralized ministries, universities, NGOs and local communities will all participate in the deployment of science-based vulnerability assessments in the targeted regions. The National Meteorology Directorate will be called upon to perform climate model downscaling and to provide climate data. Municipal and regional land use planning and urban planning divisions will be called upon to participate in the development of vulnerability maps and inundatable zones for key cities. The Ministry of Agriculture will lead the development of crop systems models. The University has previously been involved in conducting vulnerability studies as part of the German-Malagasy Environment Programme and can bring experience to the exercise.
	1.2 An effective coordinating mechanism for climate change adaptation is in place in project sites (Menabe, Boeny, Vatovavy Fitovinany and Atsinanana)	The National ICZM committee will lead this process and will provide support to the regional authorities in setting up of their regional ICZM committees. The Ministry of Environment will provide oversight.
	1.3 Comprehensive regional coastal adaptation plans developed for four regions (Menabe, Boeny, Vatovavy Fitovinany and Atsinanana)	Regional ICZM committees created in 1.2 will be entrusted with the creation of adaptation plans on the basis of knowledge developed in 1.1. Communities, the media, NGOs and the private sector will be invited to participate in the development of these plans. Ministry of Environment and Forests will lead at national and regional level on the deployment of an awareness raising strategy.
2.	2.1 Shorelines are rehabilitated through restoration of protective ecosystem services	Ministry of Environment, universities and research centres along with relevant NGOs and with the support of communities, will lead on the establishment of studies for the rehabilitation of ecosystems (mangroves) and will supervise the work execution (mangrove rehabilitation and shoreline stabilization) through NGOs or local communities.
	2.2 Sustainable natural resource use practices and alternative livelihoods introduced in project sites	MEF will lead on the development of the methodology, along with Universities and research centers, the Office national de l'environnement (ONE) and relevant NGO partners. MEF will provide in service practical training to decentralized environment staff to support the initial measurements of indicators contained in the methodology.
	2.3 Technologies for protection and rehabilitation of coastal productive assets are demonstrated adjacent to restored ecosystems	Ministry of Fisheries will work with local fishing communities to develop and negotiate new fishing practices and calendars. Ministry of Environment and Forests will work with local communities to develop community-based reforestation and forest conservation schemes in targeted areas. Ministry of Agriculture, along with Ministry of Water and Fisheries, will work with local communities to assess the study for cost effectiveness of alternative livelihoods and to implement selected livelihoods strategies in targeted communities. MEF will provide supervisory functions and support awareness raising activities. Universities and research centres will collect data and findings emanating from project implementation.

STAKEHOLDER PARTICIPATION		
Project Component	Outputs	Stakeholders and role
		Ministry of Environment with Ministry of Public Works and municipal authorities will supervise the design of engineering studies related to the proposed infrastructure construction and rehabilitation. MEF will supervise the execution of EIA as per legal requirements, along with ONE. The works will be executed by private sector enterprises under the supervision of the Ministry of Public Works.
3.	3.1 Training provided to increase institutional capacity of government officials to develop resilient standards, legislative instruments, norms and sectoral plans	MEF will supervise the deployment of a training program to be delivered to sectoral partners in each region, along with trainings and awareness raising seminars targeted to NGOs and the private sector. Universite d'Antananarivo and affiliated research centres will collect data and findings from project implementation which MEF can draw upon in policy interventions.
	3.2 Training provided to non-state stakeholders to participate in adaptation planning and adaptation actions	
	3.3 Existing strategies and laws are modified to integrate climate change adaptation with adequate budgetary allocations for implementation	The regional ICZM committees, the regional planning authorities and municipal authorities will each be responsible for leading the participatory revision of relevant plans. Ministry of Environment, along with the Madagascar National Parks Agency will revise the Protected Areas Law as necessary. The Ministry of Fisheries will lead on the revision of the fisheries act and regulations.

## SECTION 6: MONITORING AND EVALUATION PLAN

268. The project will be monitored through the following Monitoring & Evaluation (M&E) activities. The M&E budget is provided in Appendix 7. The project M&E plan is consistent with the GEF Monitoring and Evaluation policy. The Project Results Framework presented in Appendix 4 includes SMART indicators for each expected outcome and output as well as mid-term and end of project targets. These indicators, when necessary along with the key deliverables and benchmarks, could be developed in some more detail and fine tuned during the inception phase of the project and will be the main tools for assessing project implementation progress and whether project results are being achieved. The means of verification and the costs associated with obtaining the information to track the indicators are summarized in Appendix 7. Other M&E related costs are also presented in the costed M&E Plan and are fully integrated in the overall project budget.
269. The M&E plan will be reviewed and revised as necessary during the project inception workshop to ensure project stakeholders understand their roles and responsibilities vis-à-vis project monitoring and evaluation. At the time of project approval, baseline data for most of the indicators established in the Results Framework was available. Baseline data gaps will be addressed during the first year of project implementation.
270. Day-to-day project monitoring is the responsibility of the project coordinating unit but other project partners will have responsibilities to collect specific information to track the indicators. It is the responsibility of the Project Coordinator to inform the PSC of any delays or difficulties faced during implementation so that the appropriate support or corrective measures can be adopted in a timely fashion. To perform these tasks, the project will be supported by a Monitoring and Evaluation Clerk, who will be a

part-time member of the project coordination unit and will be trained in accordance to UNEP rules and regulations in terms of monitoring and evaluation.

271. The Project Steering Committee will receive periodic reports on progress and will make recommendations concerning the need to revise any aspects of the Results Framework or the M&E Plan. Project oversight is the responsibility of the Task Managers of UNEP. The Task Manager will review the quality of draft project outputs, provide feedback to the project partners, and establish peer review procedures to ensure adequate quality of scientific and technical outputs and publications.

272. Project supervision will take an adaptive management approach. The UNEP Task Manager will develop a project supervision plan at the inception of the project which will be communicated to the project partners during the inception workshop, which will be held within the first 2 months of project commencement with those with assigned roles in the project organization structure, UNEP staff and where appropriate/feasible other technical, policy and program advisors as well as other stakeholders. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan. The Inception Workshop should address a number of key issues including:

- Assisting all partners to fully understand and take ownership of the project.
- Discussion on the roles, support services and complementary responsibilities of UNEP staff vis-à-vis the project team.
- Discussion on the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms.
- Discussion on the Terms of Reference for project staff if required.
- Finalize the annual work plan (AWP), based on the project results framework and the relevant SOF (e.g. GEF) Tracking Tool if appropriate.
- Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.
- Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements.
- Agreement and scheduling of the Monitoring and Evaluation work plan and budget.
- Discussion of financial reporting procedures and obligations, and arrangements for annual audit.
- Plan and schedule Project Committee meetings.
- Clarification of the roles and responsibilities of all project organization structures and planning of meetings.

273. The first Project Steering Committee meeting should be held within the first 10 months following the inception workshop.

274. An Inception Workshop Report is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the meeting. Progress made shall be monitored in the UNEP system.

275. Project Implementation Reports (PIR): This key report is prepared to monitor progress made since project start and in particular for the previous reporting period (June 30<sup>th</sup> to July 1<sup>st</sup>). The PIR combines UNEP and GEF reporting requirements. The PIR includes, but is not limited to, reporting on the following:
- Progress made toward project objective and project outcomes each with indicators, baseline data and end of project targets (cumulative).
  - Project outputs delivered per project outcome (annual).
  - Lesson learned/good practices.
  - AWP and other expenditure reports.
  - Risk and adaptive management.
  - Portfolio level indicators (i.e. GEF focal area tracking tools) are used by most focal areas on an annual basis as well.
276. Periodic Monitoring through site visits: Relevant staff from UNEP will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Other members of the Project Steering Committee may also join these visits. A Field Visit Report/BTOR will be prepared by the UNEP no less than one month after the visit to the project team and Project Steering Committee members.
277. Mid-term of project cycle: The project will undergo an independent Mid-Term Evaluation or Mid Term Review at the mid-point of project implementation. UNEP will be responsible for managing the mid-term review/evaluation and the terminal evaluation. The Project Manager and partners will participate actively in the process. The project will be reviewed or evaluated at mid-term (tentatively in 05/2017 as indicated in the project milestones). The purpose of the Mid-Term Review (MTR) or Mid-Term Evaluation (MTE) is to provide an independent assessment of project performance at mid-term, to analyze whether the project is on track, what problems and challenges the project is encountering, and which corrective actions are required so that the project can achieve its intended outcomes by project completion in the most efficient and sustainable way. In addition, it will verify information gathered through the GEF tracking tools. The project Steering Committee will participate in the MTR or MTE and develop a management response to the evaluation recommendations along with an implementation plan. It is the responsibility of the UNEP Task Manager to monitor whether the agreed recommendations are being implemented. An MTR is managed by the UNEP Task Manager. An MTE is managed by the Evaluation Office (EO) of UNEP. The EO will determine whether an MTE is required or an MTR is sufficient.
278. End of Project: An independent Terminal Evaluation (TE) will take place at the end of project implementation. The EO will be responsible for the TE and liaise with the UNEP Task Manager throughout the process. The TE will provide an independent assessment of project performance (in terms of relevance, effectiveness and efficiency), and determine the likelihood of impact and sustainability. It will have two primary purposes:
- i) to provide evidence of results to meet accountability requirements, and
  - ii) to promote learning, feedback, and knowledge sharing through results and lessons learned among UNEP and executing partners.
279. While a TE should review use of project funds against budget, it would be the role of a financial audit to assess probity (i.e. correctness, integrity etc.) of expenditure and transactions.

280. The TE report will be sent to project stakeholders for comments. Formal comments on the report will be shared by the EO in an open and transparent manner. The project performance will be assessed against standard evaluation criteria using a six point rating scheme. The final determination of project ratings will be made by the EO when the report is finalised. The evaluation report will be publically disclosed and will be followed by a recommendation compliance process. The direct costs of reviews and evaluations will be charged against the project evaluation budget.
281. The project Steering Committee will receive periodic reports on progress and will make recommendations to UNEP concerning the need to revise any aspects of the Results Framework or the M&E Plan. Project oversight to ensure that the project meets UNEP and GEF policies and procedures is the responsibility of the Task Manager in UNEP/GEF. The Task Manager will also review the quality of draft project outputs, provide feedback to the project partners, and establish peer-reviewed procedures to ensure adequate quality of scientific and technical outputs and publications.
282. Project supervision will take an adaptive management approach. The Task Manager will develop a project supervision plan at the inception of the project which will be communicated to the project partners during the inception workshop. The emphasis of the Task Manager supervision will be on outcome monitoring but without neglecting project financial management and implementation monitoring. Progress vis-à-vis delivering the agreed project global environmental benefits will be assessed with the Steering Committee at agreed intervals. Project risks and assumptions will be regularly monitored both by project partners and UNEP. Risk assessment and rating is an integral part of the Project Implementation Review (PIR). The quality of project monitoring and evaluation will also be reviewed and rated as part of the PIR. Key financial parameters will be monitored quarterly to ensure cost effective use of financial resources.
283. The tracking tools (Appendix 15) will be validated/updated at inception, mid-term and at the end of the project and will be made available to the GEF Secretariat along with the project PIR report. As mentioned above the mid-term and terminal evaluation will verify the information of the tracking tool.

## SECTION 7: PROJECT FINANCING

### 7.1 OVERALL PROJECT BUDGET

Overall budget

<b>OVERALL BUDGET</b>			
	<b>GEF/LDCF Funds (\$)</b>	<b>Co Financing(\$)</b>	<b>Total cost(\$)</b>
Total Project cost (\$)	5,337,500	12,050,000	17,387,500

### 7.2 PROJECT CO FINANCING

The total project co financing is \$ 12,050,000 with \$ 9,380,000 provided in grant, and \$ 2,670,000 in kind.

### 7.3 PROJECT COST EFFECTIVENESS

284. The NAPA process identified and considered various alternatives for adaptation in the key social, economic and environmental sectors of Madagascar. In this process, a cost-benefit ratio was used as one of the criteria to select priority actions. A further selection was done on the basis of adaptation options that were proposed by regional stakeholders during project development. Hence, the actions proposed are not only the most urgent and most pressing, they are also the most cost effective. The approach taken for the development of this project has sought to build on linkages with government policies and programmes, which is expected to generate multiplied benefits nationally. A number of considerations related to cost and benefits were also included in the analyses that informed the final project design.
285. In addition, during project design, four thematic studies were developed that detailed all the adaptation needs in the targeted regions, and that provided a cost and benefit analysis of each proposed adaptation measure. As a result, the project was able to select among the most urgent needs, while implementing the most cost effective measures possible.
286. For Component 1, a number of alternative but more costly options were considered to achieve the project outcomes. For example, it was decided that the project would support only two downscaled climate models instead of one for each region, because the regional specificities would be too difficult to render within the parameters of available climate data, and because the differences would not justify the exercise. However, two downscaled models were maintained in order to account for the differences between the East and West coast, which are subject to different climatic influences. This will also build on available climate downscaled models made available through the first, second and third National Communications. In addition, it was decided, for cost savings measures, that the project would perform only one crop model outlook for the major non-rice crops in each region, with an emphasis on crops that are common to more than one region. Since rice models are being developed in the Adaptation Fund supported project (Resilience in the Rice Sector), it was deemed more effective that the project focus on the crops most important in coastal areas.
287. For Component 2, the project decided to focus on those ecosystems that required urgent rehabilitation, where no efforts had been deployed, and where the ecosystems could continue to function as protective and productive systems. In this regard, the project is focusing on mangroves where they are most prevalent (West Coast) and on coastal forests where they are most important (East Coast). In order to identify the most appropriate infrastructure rehabilitation measures, the project focused on areas where degradation would lead to imminent destruction or disappearance of important economic assets, and has opted to limit to the minimum its interventions in the infrastructural domain. These interventions, in order to be made more effective, are reinforced by measures to rehabilitate natural buffering areas in zones immediately co-located with the infrastructure to be rehabilitated. As a result, the project will only be rehabilitating infrastructure in two regions, where it is urgently needed but where ecosystems cannot fulfil this function alone, whereas in the western coast, the project focuses on rehabilitating natural buffers. Some activities, that were proposed in the original project concept, such as dredging of estuaries, were foregone due to high costs and low efficiency rates.
288. One option that was foregone due to costs was the option to create a coastal early warning system, which had been proposed in the early project concept. Studies conducted during the project design phase led to the realization that much remained to be set in place in order to achieve a functional EWS in any of the four regions. The project would have had to acquire and install a large number of weather stations, to set up the informatics and telemetric systems to allow these to send and receive data, to set up regional meteorological interpretation centers, as well as to build the capacity of the central meteorology system. As a result, rather than to implement a partial and potentially ineffective solution to a large problem, it was decided to remove this activity from the project.

289. Other cost effective considerations taken into account during the design of the project include: building upon existing ICZM committees and structures; implementing of EbA measures which has been highly recognized as being ‘beneficial from an economic point of view’ as it takes into account both the ‘social and ecological benefits that are associated with EbA projects.’<sup>54</sup> Furthermore, provisions have been made within the project to measure the cost effectiveness during project implementation through activity 8 in Component 2.
290. The current project design offers the most cost effective measures to address the urgent and immediate adaptation needs in the four coastal regions. However, future projects would be required to address the full scope of investment needed to rehabilitate coastal defences, coastal ecosystems, and to fully remove all the barriers to coastal resilience.

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<sup>54</sup> Making the case for Ecosystem-based Adaptation, UNEP, UNDP and IUCN joint publication, 2012, page 7

## Appendices

### APPENDIX 1- RECONCILIATION BETWEEN GEF ACTIVITY BASED BUDGET AND UNEP BUDGET LINE (GEF FUNDS ONLY US\$)

Adapting Coastal Zone management to Climate Change considering ecosystem and livelihoods													
APPENDIX 1 - RECONCILIATION BETWEEN GEF ACTIVITY BASED BUDGET AND UNEP BUDGET LINE (GEF FUNDS ONLY US\$)													
Project title: Adapting Coastal Zone management to Climate Change considering ecosystem and livelihoods													
Project number:													
Project executing partner:Ministère de l'Environnement et des Forêts													
Project implementation period:													
From:	Jun -14												
To:	July -19												
		Expenditure by Outcome						Annual Expenditures					
		Outcome 1	Outcome 2	Outcome 3	PM	ME	Total	Total Y1	Total Y2	Total Y3	Total Y4	Total Y5	Total
<b>11 PERSONNEL COMPONENT</b>													
1101	PROJECT COORDINATOR	14,400	18,000	18,000	36,000		86,400	17,280	17,280	17,280	17,280	17,280	86,400
1103	M&E Officer				49,980		49,980	9,996	9,996	9,996	9,996	9,996	49,980
1199	<b>SUBTOTAL</b>	<b>14,400</b>	<b>18,000</b>	<b>18,000</b>	<b>85,980</b>	<b>-</b>	<b>136,380</b>	<b>27,276</b>	<b>27,276</b>	<b>27,276</b>	<b>27,276</b>	<b>27,276</b>	<b>136,380</b>
<b>12 CONSULTANTS</b>													
1201	IC - VA Trainer	41,250					41,250	41,250	-	-	-	-	41,250
1202	IC - climate modelling specialist	13,750					13,750	13,750	-	-	-	-	13,750
1203	NC - climatologists (2)	18,750					18,750	18,750	-	-	-	-	18,750
1204	NC - land use planner	12,500					12,500	12,500	-	-	-	-	12,500

1205	NC - Hydrologist	12,500					12,500	12,500	-	-	-	-	12,500
1206	IC - Production systems outlook specialist	44,688					44,688	34,375	10,313	-	-	-	44,688
1207	NC - agriculture specialists (2)	73,500					73,500	37,500	36,000	-	-	-	73,500
1208	NC - coastal zone governance experts (2)	37,500					37,500	-	37,500	-	-	-	37,500
1209	NC - coastal adaptation specialist	31,250					31,250	-	31,250	-	-	-	31,250
1210	NC - adaptation planning specialist (4)	33,875					33,875	-	21,875	12,000	-	-	33,875
1211	IC - Chief Technical Advisor	45,000	45,000	33,000			123,000	24,600	24,600	24,600	24,600	24,600	123,000
1212	NC - Coastal Fisheries specialists		96,875				96,875	-	-	46,875	50,000	-	96,875
1213	NC-Community-based forest management specialist		50,625				50,625	-	9,375	28,750	12,500	-	50,625
1214	NC-Agronomers (4)		200,000				200,000	-	100,000	100,000	-	-	200,000
1215	NC - beekeeping specialists		87,500				87,500	-	-	25,000	31,250	31,250	87,500
1216	IC - climate change policy and planning specialist			48,125			48,125	-	-	-	-	48,125	48,125
1217	NC - governance specialist			25,000			25,000	-	-	-	-	25,000	25,000
1218	IC - climate change training specialist			27,500			27,500	27,500	-	-	-	-	27,500
1219	NC - climate change training specialist			37,500			37,500	12,500	-	-	-	25,000	37,500
1220	NC - EIA specialist			18,750			18,750	-	-	-	-	18,750	18,750
1221	IC - climate change law specialist			27,500			27,500	-	-	-	-	27,500	27,500
1222	NC - legal and governance experts			37,500			37,500	-	-	-	-	37,500	37,500
1223	NC - government planning experts			37,500			37,500	-	-	-	-	37,500	37,500

1224	NC - ICZM planning experts			37,500			37,500	-	-	-	-	37,500	37,500
1225	IC - ICZM expert			27,500			27,500	-	-	-	-	27,500	27,500
1226	NC - government finance expert			28,125			28,125	-	-	-	-	28,125	28,125
1228	Regional Technicians (4)	21,320	21,320	72,000			114,640	22,928	22,928	22,928	22,928	22,928	114,640
1229	NC - ecologist	50,000					50,000	25,000	25,000	-	-	-	50,000
1230	NC - communications specialist			60,000			60,000	12,000	12,000	12,000	12,000	12,000	60,000
1231	IC - climate change and agriculture specialist		82,500				82,500	-	41,250	41,250	-	-	82,500
1232	NC - tourism specialist		25,000				25,000	-	-	-	25,000	-	25,000
1232	IC - ecotourism expert		55,000				55,000	-	-	-	55,000	-	55,000
<b>1299</b>	<b>SUB TOTAL</b>	<b>435,883</b>	<b>663,820</b>	<b>517,500</b>	<b>-</b>	<b>-</b>	<b>1,617,203</b>	<b>295,153</b>	<b>372,091</b>	<b>313,403</b>	<b>233,278</b>	<b>403,278</b>	<b>1,617,203</b>
<b>13 ADMINISTRATIVE SUPPORT</b>													
1301	Finance and Administration Specialist				75,000		75,000	15,000	15,000	15,000	15,000	15,000	75,000
1302	Logistics/driver				16,200		16,200	3,240	3,240	3,240	3,240	3,240	16,200
<b>1399</b>	<b>SUB-TOTAL</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>91,200</b>	<b>-</b>	<b>91,200</b>	<b>18,240</b>	<b>18,240</b>	<b>18,240</b>	<b>18,240</b>	<b>18,240</b>	<b>91,200</b>
<b>16 TRAVEL</b>													
1603	Travel for PM				20,020		20,020	4,020	4,000	4,000	4,000	4,000	20,020
<b>1699</b>	<b>SUB-TOTAL</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>20,020</b>	<b>-</b>	<b>20,020</b>	<b>4,020</b>	<b>4,000</b>	<b>4,000</b>	<b>4,000</b>	<b>4,000</b>	<b>20,020</b>
<b>1999</b>	<b>COMPONENT TOTAL</b>	<b>450,283</b>	<b>681,820</b>	<b>535,500</b>	<b>197,200</b>	<b>-</b>	<b>1,864,803</b>	<b>344,689</b>	<b>421,607</b>	<b>362,919</b>	<b>282,794</b>	<b>425,794</b>	<b>1,864,803</b>
<b>20 SUB-CONTRACTS COMPONENT</b>													

<b>2200</b>	<b>Sub-contracts (MOUs/LOAs for supporting organizations)</b>													
2201	Sub-contract NGO mangrove rehabilitation		144,000				144,000	-	25,000	119,000	-	-	144,000	
<b>2299 SUB-TOTAL</b>		-	<b>144,000</b>	-	-	-	<b>144,000</b>	-	<b>25,000</b>	<b>119,000</b>	-	-	<b>144,000</b>	
<b>2300</b>	<b>Sub-contracts (for commercial purposes)</b>													
2301	sub-contract shoreline revegetation		16,400				16,400	-	8,000	8,400	-	-	16,400	
2302	Sub-contract consultancy firm		35,000				35,000	35,000	-	-	-	-	35,000	
2304	sub-contract coastal engineering firm		1,120,000				1,120,000	-	-	-	1,120,000	-	1,120,000	
2305	sub-contract coastal engineering firm		700,000				700,000	-	-	-	700,000	-	700,000	
<b>2399 SUB-TOTAL</b>		-	<b>1,871,400</b>	-	-	-	<b>1,871,400</b>	<b>35,000</b>	<b>8,000</b>	<b>8,400</b>	<b>1,820,000</b>	-	<b>1,871,000</b>	
<b>2999 COMPONENT TOTAL</b>		-	<b>2,015,400</b>	-	-	-	<b>2,015,400</b>	<b>35,000</b>	<b>33,000</b>	<b>127,400</b>	<b>1,820,000</b>	-	<b>2,015,400</b>	
<b>30 TRAINING COMPONENT</b>														
<b>3200 TRAINING WORKSHOPS</b>														
3202	Training on ecotourism		40,000				40,000	-	-	-	40,000	-	40,000	
3203	Training workshops on mainstreaming			20,000			20,000	-	-	-	-	20,000	20,000	
3204	sectoral training workshops			20,000			20,000	20,000	-	-	-	-	20,000	
3205	Ngo training workshops			20,000			20,000	-	-	-	-	20,000	20,000	
3206	Private sector training workshops			20,000			20,000	-	-	-	-	20,000	20,000	

3301	VA Training workshop	15,000					15,000	15,000	-	-	-	-	15,000
3302	Training workshop on production systems outlook	15,000					15,000	15,000	-	-	-	-	15,000
3303	Beekeeping training workshops		40,000				40,000	-	-	40,000	-	-	40,000
<b>3299 SUB-TOTAL</b>		<b>30,000</b>	<b>80,000</b>	<b>80,000</b>	-	-	<b>190,000</b>	<b>50,000</b>	-	<b>40,000</b>	<b>40,000</b>	<b>60,000</b>	<b>190,000</b>
<b>3300 MEETINGS/CONFERENCES</b>													
3303	ICZM coordination meetings	40,000					40,000	-	40,000	-	-	-	40,000
3304	Adaptation planning consultation meetings	34,000					34,000	-	16,000	18,000	-	-	34,000
3306	Fisheries Meetings and workshops		32,000				32,000	-	-	-	32,000	-	32,000
3307	meetings and workshops (forest management)		12,000				12,000	-	3,000	9,000	-	-	12,000
3308	community meetings and workshops		80,000				80,000	-	40,000	40,000	-	-	80,000
3310	PSC and project meetings				16,797		16,797	4,297	3,500	3,000	3,000	3,000	16,797
<b>3399 SUB-TOTAL</b>		<b>74,000</b>	<b>124,000</b>	-	<b>16,797</b>	-	<b>214,797</b>	<b>4,297</b>	<b>102,500</b>	<b>70,000</b>	<b>35,000</b>	<b>3,000</b>	<b>214,797</b>
<b>3999 COMPONENT TOTAL</b>		<b>104,000</b>	<b>204,000</b>	<b>80,000</b>	<b>16,797</b>	-	<b>404,797</b>	<b>24,297</b>	<b>102,500</b>	<b>70,000</b>	<b>75,000</b>	<b>63,000</b>	<b>334,797</b>
<b>40 MATERIALS AND EQUIPEMENT COMPONENT</b>													
<b>4100 EXPENDABLE EQUIPMENT</b>													

4105	reforestation materials		30,000				30,000	-	10,000	20,000	-	-	30,000
<b>4199 SUB-TOTAL</b>		-	<b>30,000</b>	-	-	-	<b>30,000</b>	-	<b>10,000</b>	<b>20,000</b>	-	-	<b>30,000</b>
<b>4200 NON-EXPENDABLE EQUIPMENT</b>													
4201	materials and equipment (ecotourism)		70,000				70,000	-	-	-	35,000	35,000	70,000
4202	Vehicle and maintenance for supervision of works		173,000				173,000	93,000	20,000	20,000	20,000	20,000	173,000
4203	Materials and equipment (resilient agriculture)		240,000				240,000	-	80,000	160,000	-	-	240,000
4205	Beekeeping equipment		100,000				100,000	-	-	100,000	-	-	100,000
4208	Fisheries materials		150,000				150,000	-	-	150,000	-	-	150,000
<b>4299 SUB-TOTAL</b>		-	<b>733,000</b>	-	-	-	<b>733,000</b>	<b>93,000</b>	<b>100,000</b>	<b>430,000</b>	<b>55,000</b>	<b>55,000</b>	<b>733,000</b>
<b>4999 COMPONENT TOTAL</b>		-	<b>763,000</b>	-	-	-	<b>763,000</b>	<b>93,000</b>	<b>110,000</b>	<b>450,000</b>	<b>55,000</b>	<b>55,000</b>	<b>763,000</b>
<b>50 MISCELLANEOUS COMPONENT</b>													
<b>5300 REPORTING COSTS</b>													
5301	Printing (maps)	5,000					5,000	5,000	-	-	-	-	5,000
5302	Printing, media costs			92,000			92,000	20,000	20,000	20,000	20,000	12,000	92,000
5305	Printing and reporting costs	20,000	20,000	20,000			60,000	12,000	12,000	12,000	12,000	12,000	60,000
<b>5399 SUB-TOTAL</b>		<b>25,000</b>	<b>20,000</b>	<b>112,000</b>	-	-	<b>157,000</b>	<b>37,000</b>	<b>32,000</b>	<b>32,000</b>	<b>32,000</b>	<b>24,000</b>	<b>157,000</b>
<b>5500 MONITORING AND EVALUATION</b>													
5581	audit						17,500	3,500	3,500	3,500	3,500	3,500	17,500

5582	IC-Baseline study					45,000	45,000	45,000	-	-	-	-	45,000
5583	Mid-term evaluation						35,000	-	-	-	35,000	-	35,000
5584	Final evaluation					35,000	35,000	-	-	-	-	35,000	35,000
<b>5599 SUB-TOTAL</b>		-	-	-	-	132,500	132,500	38,500	3,500	3,500	38,500	38,500	132,500
<b>5999 COMPONENT TOTAL</b>		25,000	20,000	112,000	-	132,500	289,500	85,500	35,500	35,500	70,500	62,500	289,500
<b>PROJECT TOTAL</b>		579,283	3,684,220	727,500	213,997	132,500	5,337,500	612,486	702,607	1,085,819	2,303,294	633,294	5,337,000

## Budget Notes

- 1 Costs of project coordinator; split between outcomes (60%) and project management (40%)
- 2 Costs of a part-time Monitoring and Evaluation Officer

***All consultancies are calculated on the basis of lump sum agreements inclusive of 25% of travel.***

- 3 Costs of training for local government authorities on CCA and VA in Coastal Zones and perform 4 CC VRA studies using participatory vulnerability assessment tool DIVA (DINAS-Coast) and VIA guidelines (PROVIA)
- 4 Consultant to support the development of an assessment of CC impacts to coastal ecosystems and their services for the four regions and to assist in the development of downscaled climate scenarios using data available from the National Communications and National Met service, for the east and western coastal zones. .
- 5 Consultants to perform downscaled climate scenarios using data available from the National Communications and National Met service, for the east and western coastal zones.
- 6 Consultant to establish a map of inundate-able zones in 4 coastal regions
- 7 Consultant o establish a map of inundate-able zones in 4 coastal regions
- 8 International Consultant to develop and deliver training on and development of a production systems outlook for 2050 for the top non-rice agricultural value-chains: fisheries, cassava,peanuts, banana
- 19 National Consultants to develop and deliver training on and development of a production systems outlook for 2050 for the top non-rice agricultural value-chains: fisheries, cassava,peanuts, banana
- 10 National consultants to support the creation of a coordination mechanism (in Antsinanana, Vatovavy Fitovinany and Boeny) for adaptation and ICZM at the regional level building on existing coordination platforms (including national ICZM platform);and to integrate adaptation issues into the existing coordination mechanism in Menabe.
- 11 National consultants to support the creation of a coordination mechanism (in Antsinanana, Vatovavy Fitovinany and Boeny) for adaptation and ICZM at the regional level building on existing coordination platforms (including national ICZM platform);and to integrate adaptation issues into the existing coordination mechanism in Menabe.
- 12 National consultants to identify recommended adaptation actions at regional level on the basis of vulnerability assessments, models and studies under activities 1,2,3 and 4
- 13 Chief technical advisor for the project

- 14 National fisheries specialist to negotiate new fishing calendars and assist in the implementation of sustainable fisheries practices
- 15 National consultant to support the development of sound forest management practices, including development of woodlots, reduced deforestation in mangroves
- 16 National Experts to promote diversification of crops and climate-smart agriculture, such as vegetable production, improved crop varieties, improved cultivation techniques, in 8 communes in the four regions
- 17 National experts to support the development of beekeeping
- 18 International consultant to develop and implement a training programme on integrating environmental and climate change concerns into legislation and regulation for national and regional parliamentarians and district/regional administrations
- 19 National consultant to develop and implement a training programme on integrating environmental and climate change concerns into legislation and regulation for national and regional parliamentarians and district/regional administrations
- 20 International consultant to develop and implement a series of sectoral training programmes on climate change adaptation (agriculture, tourism, infrastructure, water, fisheries and forestry).
- 21 National consultant to develop and implement a series of sectoral training programmes on climate change adaptation (agriculture, tourism, infrastructure, water, fisheries and forestry).
- 22 National consultant to help revise EIA texts and procedures
- 23 IC to help revise the fisheries law and the protected areas law to take into account the results of vulnerability studies and adaptation measures identified in Component 1
- 24 NC to revise the fisheries law and the protected areas law to take into account the results of vulnerability studies and adaptation measures identified in Component 1
- 25 National experts to revise regional development planning frameworks in 4 coastal regions to integrate climate change resilience and adaptation concerns.
- 26 National experts to review and revise the national ICZM strategy and policy, in light of regional strategies developed in component 1, working with the national ICZM committee.
- 27 International Consultant to help review and revise the national ICZM strategy and policy, in light of regional strategies developed in component 1, working with the national ICZM committee.
- 28 National expert to support the development of a strategy to explore opportunities for upscaling and financing coastal adaptation including through public-private partnership and financing.
- 29 Regional technicians serving as focal points for the project in each region, seconded from MEF
- 30 Ecologists to complete an assessment of CC impacts to coastal ecosystems and their services for the four regions.
- 31 National communications advisor to design and deploy an outreach and awareness raising campaign at regional and national level (for general public)
- 32 International consultant to help promote diversification of crops and climate-smart agriculture, such as vegetable production, improved crop varieties, improved cultivation techniques, in 8 communes in the four regions
- 33 NC to support the implementation of sustainable ecotourism practices
- 34 International expert on ecotourism development
- 35 Support for financial management for the project
- 36 Travel for project management unit
- 37 Sub-contract with an NGO for mangrove rehabilitation inclusive of EIA costs
- 38 Sub-contract for undertaking shoreline revegetation inclusive of EIA costs
- 39 Sub-contract for undertaking a participatory study on the cost effectiveness, gender dynamics and resilience of proposed alternative livelihoods options
- 40 Sub-contract for the rehabilitation of the sea wall, inclusive of EIA costs
- 41 Sub-contract for the restoration and completion of the existing system of protection combining groyne and sea walls in City of Toamasina (1.1 km), including feasibility and EIA
- 42 Training workshop for private sector and NGOs on ecotourism
- 43 Training workshops on mainstreaming climate change adaptation into planning processes
- 44 Regional sectoral training programmes on climate change adaptation (agriculture, tourism, infrastructure, water, fisheries and forestry).
- 45 Awareness raising seminars for NGOs on adaptation, ecosystem-based adaptation, climate change and development
- 46 Training workshops for private sector on climate change and investment planning (tourism, fisheries)
- 47 Training on vulnerability assessments using DIVA or PROVIA methodologies

- 48 Training on productions systems outlooks for regional officers
- 49 Meetings on the development of ICZM coordination mechanisms
- 50 Meetings and workshops on development of regional adaptation plans
- 51 Meetings and workshops on the development of new fisheries calendars and fisheries practices
- 52 Meetings on forest management
- 53 Community meetings on agriculture
- 54 Project Steering committee meetings
- 55 Biomass and materials for reforestation
- 56 materials and equipement for installation of ecotourism facilities
- 57 vehicle for project works supervision with annual maintenance and repair costs
- 58 materials, equipement and implements for the implemenation of resilient agricultural practices
- 59 beekeeping materials
- 60 fisheries materials, including nets, boats,traps, etc
- 61 printing costs for maps of inundatable areas
- 62 costs of an awareness raising campaign
- 63 Regular costs of printing and reporting for project outputs, studies, reports
- 64 Annual audit costs
- 65 Costs of a baseline study
- 66 Mid-term Review/Evaluation
- 67 Terminal evaluation

**APPENDIX 2 - RECONCILIATION BETWEEN LDCF AND CO FINANCE BUDGET (TOTAL LDCF AND CO FINANCE)**

<b>Adapting Coastal Zone management to Climate Change considering ecosystem and livelihoods</b>								
<b>APPENDIX 2 - Co-financing</b>								
Project title: Adapting Coastal Zone management to Climate Change considering ecosystem and livelihoods								
Project number:								
Project executing partner:Ministère de l'Environnement et des Forêts								
Project implementation period:								
From:	<b>Jun-14</b>							
To:	<b>July-19</b>							
0	0	<b>Total</b>	<b>MinA gri IK</b>	<b>MinAgri Program s</b>	<b>MEF IK</b>	<b>MEF Programs</b>	<b>UNEP</b>	<b>TOTAL Co\$</b>
0	0	0	-	-	-	-	-	-
<b>11 PERSONNEL COMPONENT</b>		0	-	-	-	-	-	-
1101	PROJECT COORDINATOR	87,200	-	-	100,000	-	400,000	500,000
1103	M&E Officer	16,200	-	-	-	-	-	-
<b>1199</b>	<b>SUBTOTAL</b>	<b>103,400</b>	-	-	<b>100,000</b>	-	<b>400,000</b>	<b>500,000</b>
<b>0</b>		-	-	-	-	-	-	-
<b>12 CONSULTANTS</b>		-	-	-	-	-	-	-
1201	IC - VA Trainer	41,250	-	500,000	100,000	-	300,000	900,000
1202	IC - climate modelling specialist	13,750	-	-	300,000	-	-	300,000
1203	NC - climatologists (2)	18,750	-	-	-	-	-	-
1204	NC - land use planner	12,500	-	-	-	80,000	-	80,000
1205	NC - Hydrologist	12,500	-	-	-	-	-	-
1206	IC - Production systems outlook specialist	44,688	-	-	300,000	-	-	300,000
1207	NC - agriculture specialists (2)	73,500	-	-	-	-	-	-
1208	NC - coastal zone governance experts (2)	37,500	-	-	800,000	-	-	800,000
1209	NC - coastal adaptation specialist	31,250	-	-	-	-	-	-
1210	NC - adaptation planning specialist (4)	33,875	-	-	-	200,000	-	200,000
1211	IC - Chief Technical Advisor	123,000	-	-	-	-	-	-
1212	NC - Coastal Fisheries specialists	96,875	500,000	3,500,000	-	100,000	-	100,000
1213	NC-Community-based forest management	50,625	-	-	-	100,000	-	100,000

	specialist							
1214	NC-Agronomers (4)	200,000	-	-	-	-	-	-
1215	NC - beekeeping specialists	87,500	-	-	-	-	-	-
1216	IC - climate change policy and planning specialist	48,125	-	-	50,000	200,000	300,000	550,000
1217	NC - governance specialist	25,000	-	-	-	-	-	-
1218	IC - climate change training specialist	27,500	-	500,000	-	-	-	500,000
1219	NC - climate change training specialist	37,500	-	-	-	500,000	-	200,000
1220	NC - EIA specialist	18,750	-	-	100,000	100,000	-	200,000
1221	IC - climate change law specialist	27,500	-	-	200,000	-	-	200,000
1222	NC - legal and governance experts	37,500	-	-	-	-	-	-
1223	NC - government planning experts	37,500	-	500,000	-	50,000	-	550,000
1224	NC - ICZM planning experts	37,500	-	-	-	-	-	-
1225	IC - ICZM expert	27,500	-	-	-	-	-	-
1226	NC - government finance expert	28,125	-	-	-	-	-	-
1228	Regional Technicians (4)	57,640	-	-	-	-	-	-
1229	NC - ecologist	50,000	-	-	-	800,000	-	800,000
1230	NC - communications specialist	60,000	-	-	-	-	-	-
1231	IC - climate change and agriculture specialist	82,500	-	-	-	-	-	-
1232	NC - tourism specialist	25,000	-	-	-	-	-	-
1232	IC - ecotourism expert	55,000	-	-	-	-	-	-
<b>1299</b>	<b>SUB TOTAL</b>	<b>1,560,203</b>	<b>500,000</b>	<b>5,000,000</b>	<b>1,850,000</b>	<b>2,130,000</b>	<b>600,000</b>	<b>5,780,000</b>
0		-	-	-	-	-	-	-
<b>13 ADMINISTRATIVE SUPPORT</b>		-	-	-	-	-	-	-
1301	Finance and Administration Specialist	30,000	-	-	-	-	-	-
1302	Logistics/driver	16,200	-	-	-	-	-	-
<b>1399</b>	<b>SUB-TOTAL</b>	<b>46,200</b>	-	-	-	-	-	-
0		-	-	-	-	-	-	-
<b>16 TRAVEL</b>		-	-	-	-	-	-	-
1603	Travel for PM	20,000	-	-	120,000	-	-	120,000
<b>1699</b>	<b>SUB-TOTAL</b>	<b>20,000</b>	-	-	<b>120,000</b>	-	-	<b>120,000</b>
<b>1999 COMPONENT TOTAL</b>		<b>1,729,803</b>	<b>500,000</b>	<b>5,000,000</b>	<b>2,070,000</b>	<b>2,130,000</b>	<b>1,000,000</b>	<b>6,400,000</b>
0		-	-	-	-	-	-	-
0		-	-	-	-	-	-	-
<b>20 SUB-CONTRACTS COMPONENT</b>		-	-	-	-	-	-	-
<b>2200</b>	<b>Sub-contracts (MOUs/LOAs for supporting organizations)</b>	-	-	-	-	-	-	-

2201	Sub-contract NGO mangrove rehabilitation	144,000	-	-	-	500,000	-	500,000
<b>2299 SUB-TOTAL</b>	-	<b>144,000</b>	-	-	-	<b>500,000</b>	-	<b>500,000</b>
<b>0</b>	-	-	-	-	-	-	-	-
<b>2300</b>	<b>Sub-contracts (for commercial purposes)</b>	-	-	-	-	-	-	-
2301	sub-contract shoreline revegetation	16,400	-	-	-	500,000	-	500,000
2302	Sub-contract consultancy firm	35,000	-	-	-	-	-	-
2304	sub-contract coastal engineering firm	1,200,000	-	-	-	250,000	-	250,000
2305	sub-contract coastal engineering firm	700,000	-	-	-	-	-	-
<b>2399 SUB-TOTAL</b>		<b>1,951,400</b>	-	-	-	<b>750,000</b>	-	<b>750,000</b>
<b>2999 COMPONENT TOTAL</b>		<b>2,095,400</b>	-	-	-	<b>1,250,000</b>	-	<b>1,250,000</b>
<b>0</b>		-	-	-	-	-	-	-
<b>30 TRAINING COMPONENT</b>		-	-	-	-	-	-	-
<b>3200 TRAINING WORKSHOPS</b>		-	-	-	-	-	-	-
3202	Training on ecotourism	40,000	-	-	-	-	-	-
3203	Training workshops on mainstreaming	20,000	-	-	-	-	-	-
3204	sectoral training workshops	20,000	-	-	-	-	-	-
3205	Ngo training workshops	20,000	-	-	-	-	-	-
3206	Private sector training workshops	20,000	-	-	-	-	-	-
3301	VA Training workshop	15,000	-	-	-	-	-	-
3302	Training workshop on production systems outlook	15,000	-	-	-	-	-	-
3303	Beekeeping training workshops	40,000	-	-	-	-	-	-
<b>3299 SUB-TOTAL</b>		<b>190,000</b>	-	-	-	-	-	-
<b>0</b>		-	-	-	-	-	-	-
<b>3300 MEETINGS/CONFERENCES</b>		-	-	-	-	-	-	-
0		0	0	0	0	0	0	0
0		0	0	0	0	0	0	0
3303	ICZM coordination meetings	40,000	-	-	-	-	-	-
3304	Adaptation planning consultation meetings	34,000	-	-	-	-	-	-
3306	Fisheries Meetings and workshops	32,000	-	-	-	-	-	-
3307	meetings and workshops (forest management)	12,000	-	-	-	-	-	-
3308	community meetings and workshops	80,000	-	-	-	-	-	-
3310	PSC and project meetings	16,797	-	-	60,000	-	-	60,000
<b>3399 SUB-TOTAL</b>		<b>214,797</b>	-	-	<b>60,000</b>	-	-	<b>60,000</b>
<b>3999 COMPONENT TOTAL</b>		<b>404,797</b>	-	-	<b>60,000</b>	-	-	<b>60,000</b>
<b>0</b>		-	-	-	-	-	-	-
<b>40 MATERIALS AND EQUIPEMENT COMPONENT</b>		-	-	-	-	-	-	-

<b>4100 EXPENDABLE EQUIPMENT</b>		-	-	-	-	-	-	-
4105	reforestation materials	30,000	-	-	-	-	-	-
<b>4199 SUB-TOTAL</b>		<b>30,000</b>	-	-	-	-	-	-
<b>0</b>		-	-	-	-	-	-	-
<b>4200 NON-EXPENDABLE EQUIPMENT</b>		-	-	-	-	-	-	-
4201	materials and equipment (ecotourism)	70,000	-	-	-	-	-	-
4202	Vehicle and maintenance for supervision of works	173,000	-	-	-	-	-	-
4203	Materials and equipment (resilient agriculture)	320,000	-	-	-	-	-	-
4205	Beekeeping equipment	100,000	-	-	-	-	-	-
4208	Fisheries materials	150,000	-	-	-	-	-	-
<b>4299 SUB-TOTAL</b>		<b>813,000</b>	-	-	-	-	-	-
<b>4999 COMPONENT TOTAL</b>		<b>843,000</b>	-	-	-	-	-	-
<b>0</b>		-	-	-	-	-	-	-
<b>50 MISCELLANEOUS COMPONENT</b>		-	-	-	-	-	-	-
<b>5300 REPORTING COSTS</b>		-	-	-	-	-	-	-
5301	Printing (maps)	5,000	-	-	-	-	-	-
5302	Printing, media costs	92,000	-	-	-	-	-	-
5305	Printing and reporting costs	60,000	-	-	-	-	-	-
<b>5399 SUB-TOTAL</b>		<b>157,000</b>	-	-	-	-	-	-
		-	-	-	-	-	-	-
<b>5500 MONITORING AND EVALUATION</b>		-	-	-	-	-	-	-
5581	audit	12,500	-	-	-	-	-	-
5582	IC-Baseline study	35,000	-	-	-	-	-	-
5583	Mid-term evaluation	30,000	-	-	20,000	-	-	20,000
5584	Final evaluation	30,000	-	-	20,000	-	-	20,000
<b>5599 SUB-TOTAL</b>		<b>107,500</b>	-	-	<b>40,000</b>	-	-	<b>40,000</b>
<b>5999 COMPONENT TOTAL</b>		<b>264,500</b>	-	-	<b>40,000</b>	-	-	<b>40,000</b>
		-	-	-	-	-	-	-
<b>PROJECT TOTAL</b>		<b>5,337,500</b>	<b>500,000</b>	<b>5,000,000</b>	<b>2,170,000</b>	<b>3,380,000</b>	<b>1,000,000</b>	<b>12,050,000</b>

### APPENDIX 3 - RESULTS FRAMEWORK

	Indicators	Baseline	Mid point target	End of project target	Means of Verification	Assumptions/Risks
<p><b>Project objective:</b> To reduce vulnerability of the coastal zone to climate variability and change through institutional capacity building, concrete coastal adaptation interventions and integration of climate change into policy and planning</p>	Change in Vulnerability Index in each project site	High vulnerability as identified by the NAPA. Local vulnerability score to be measured at project sites during Baseline Study		At least 15% reduction in VA Score for men and women in project sites as measured at the end of the project by a PVA during the terminal evaluation	PVAs, Baseline study, final evaluation	(A) The physical and alternative livelihoods measures will be sufficient to reduce exposure to extreme events and to build adaptive capacity. (R) There is a risk that due to ongoing political instability, the project could experience delays, particularly if the forthcoming elections lead to further instability at the regional level. The project will carefully monitor the political situation and will ensure that the capacity for delivering the project is built at multiple levels in order to avoid delays.
<p><b>Outcome 1.1</b> Strengthened institutional capacity to address climate change impacts in project sites (Menabe, Boeny, Vatovavy Fitovinany and Atsinanana)</p>	Number of coastal regions that have institutions to tackle climate risk and have adopted adaptation plans and strategies to initiate locally coordinated actions, to mitigate the effects of climate change.	To be determined by baseline study		By the end of the project at least one action taken in each of the four project sites.	Activities, projects or concept notes	(A) There is political will and availability to initiate such actions. (R) There is a risk that political instability or transition may impede coordination efforts.

	Indicators	Baseline	Mid point target	End of project target	Means of Verification	Assumptions/Risks
<b>Output 1.1.1</b> Climate change vulnerability and risks for the four coastal regions (Menabe, Boeny, Vatovavy Fitovinany and Atsinanana) are identified.	"number of vulnerability assessments, maps, and crop models prepared for each region"	There is currently only general information on potential vulnerabilities at regional level	At least one VIA, 1 map of inundatable zones, and at least 1 crop model outlook is produced for each region by mid term		Published maps, assessments, reports	(A) There is sufficient data to enable the production of regionally sufficient models. (R) There is a risk that limited capacity to effectively tackle all project components may lead to losses in capacity development. Establishing a robust multi disciplinary project implementation team supported with additional training if necessary will help mitigate against this risk.
<b>Output 1.1.2</b> A coordinating mechanism for climate change adaptation is established in project sites (in Menabe, Boeny, Vatovavy Fitovinany and Atsinanana)	Number of coastal regions which have an established committee which includes Climate Change in its mandate or ToRs  % of female participants/members in each coordinating committees	There is currently only 1 ICZM committee in Menabe but it does not target resilience issues  Female representation is low, exact figures to be determined by baseline study	One committee per region that includes in its terms of reference or mandate a reference to climate change, adaptation or resilience, by Mid Term  At least 10% of participants/members in each committee is female		ICZM committee constituting texts and mandates, participants lists	(A) There is political will and availability to participate in coordination. (R) There is a risk that political instability or transition may impede coordination efforts.

	Indicators	Baseline	Mid point target	End of project target	Means of Verification	Assumptions/Risks
<b>Output 1.1.3</b> Comprehensive adaptation plans developed for four coastal regions (in Menabe, Boeny, Vatovavy Fitovinany and Atsinanana).	number of coastal regions with adaptation plans or strategies;	There are currently no adaptation plans at the coastal zone level		by the end of the project, each region has its own coastal adaptation plan or strategy	plans, policies, documents and reports	
<b>Outcome 2.1</b> Restored and protected coastal zone	Change in exposure to climate risk in pilot sites.	To be determined by baseline study		By the end of the project at least 15% change in exposure indicators to climate hazards has been achieved		((A) The ecosystems are in a state that can be recuperated and will function appropriately after rehabilitation under appropriate management. (R) There is a risk that extreme weather events may impede or slow the rehabilitation works. The project will work actively with the Meteorology department to ensure advance warning is obtained.
<b>2.1.1</b> Shorelines are rehabilitated through restoration of protective ecosystem services	Number of hectares of mangroves planted (Boeny, Menabe)  Number of hectares of shorelines stabilized (Toamasina & Manakara)	No mangroves have been rehabilitated and no shorelines stabilized in project sites		at least 1200 hectares of mangroves rehabilitated by year 4 of the project  at least 3km2 of shorelines stabilized	physical observation	(A) The ecosystems are not in a state that is beyond recuperation and will function appropriately after rehabilitation under appropriate management. (R) There is a risk that extreme weather events may impede or slow the rehabilitation works. The project will work actively with the Meteorology department to ensure advance warning is obtained.

	Indicators	Baseline	Mid point target	End of project target	Means of Verification	Assumptions/Risks
<b>2.1.2</b> Sustainable natural resource use practices and alternative livelihoods introduced in project sites	% increase in income (men and women) from resilient and sustainable use of natural resources (all four project sites)	Baseline data to be gathered during baseline study		At least a 25% increase in income (men and women) from sustainable fisheries, resilient agriculture	PVAs, final evaluation	(A) Increased livelihoods and income do not act as a perverse incentive for local communities to continue to encroach on fragile coastal ecosystems (R) There is a risk that local communities cannot maintain enhanced livelihoods due to external factors such as extreme events, changes in market access or prices.
<b>2.1.3</b> Technologies for protection and rehabilitation of coastal productive assets are demonstrated adjacent to restored ecosystems.	km of sea wall constructed / rehabilitated in Manakara  km of combined groyne and sea wall in Toamasina;	At the moment no construction or rehabilitation is taking place		At least 1 km of sea wall constructed and rehabilitated in Mankara  At least 1 km of existing protection systems (groynes and sea walls combined) is restored and completed	physical observation; feasibility study reports and EIA reports.	(A) Rehabilitation of coastal protection associated with rehabilitation of ecosystem rehabilitation demonstrates rapid benefit. (R) There is a risk of works being delayed due to lengthy procurement and tender processes, or of their implementation taking longer than planned due to political instability.
<b>Outcome 3.1</b> Climate change adaptation measures are mainstreamed into national and sectoral development strategies, and in non-state stakeholder actions.	Number of national/sectoral plans, strategies or norms that are being modified to include climate change adaptation.  Number of non state stakeholders that are in the process of integrating climate change into their activities	To be determined by baseline study		By end of project at least one sectoral development strategy modified.  By end of project at least two non-state stakeholders in the process of integrating	Strategies or acts  Action plans, development strategies, communication strategies.	(A)The national institutional context is conducive and positive towards training and modification of strategies. Non-state stakeholders are willing to participate and change their actions. (R) There is risk that there will be no buy in from a political perspective and from NGOs and private sector stakeholders

	Indicators	Baseline	Mid point target	End of project target	Means of Verification	Assumptions/Risks
				climate change into planning and activities		
<b>3.1.1</b> Training provided to increase institutional capacity of government officials to develop resilient standards, legislative instruments, norms and sectoral plans	Number of government officials trained at national and regional level on the integration of environment and CC into planning  % of women trained	There is a limited cadre of people trained on climate change at national level and no trained people at regional level		at least 200 people trained by end of project,  At least 20% of those trained are women	Training reports, participant lists	(A) The institutional context is conducive to the application of newly acquired skills (R) There is a low risk that priorities will change due to political transition.
<b>3.1.2</b> Training provided to non-state stakeholders to participate in adaptation planning and adaptation actions	Number of people trained among NGO, and the private sector on the integration of climate change adaptation into their activities  % of women trained	No NGOs and no private sector have yet been trained at regional or national level		at least 100 people trained,  At least 20% of those trained are women	training reports, participant lists	(A) There are no institutional or legal barriers to non governmental participation in coastal adaptation efforts (R) There is a risk that political processes impede the full participation of NGOs and private sector. Political transition issues will be carefully monitored.
<b>3.1.3</b> Existing strategies and laws are modified to integrate climate change adaptation with adequate budgetary allocations for implementation	Number of strategies or acts, texts or norms that are modified to include climate change adaptation measures	at the moment there are none		by the end of the project, at least the EIA procedures and one sectoral act/strategy are modified to integrate climate change	acts or strategy, texts	(A) There is willingness and an opportunity to modify legal and regulatory texts. (R) There is a risk that the legal texts can not be approved during the project due to lengthy political processes and transition.

## APPENDIX 4 - WORK PLAN AND TIMETABLE

Component	Outcome/Outputs/Activities	Year 1				Year 2				Year 3				Year 4				Year 5			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1. Institutional Capacity Development	<b>1. Strengthened institutional capacity to address climate change impacts in project sites (Menabe, Boeny, Vatovavy Fitovinany, Atsinanana)</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	<i>1.1 Climate change vulnerability and risks for the four coastal regions (Menabe, Boeny, Vatovavy Fitovinany and Atsinanana) are identified.</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1. Training for local government authorities on CCA and VA in Coastal Zones and perform 4 CC VRA studies using participatory vulnerability assessment tool DIVA (DINAS-Coast) and VIA guidelines (PROVIA), including the identification of potential adaptation measures.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1b. Complete an assessment of CC impacts to coastal ecosystems and their services for the four regions.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2. Perform downscaled climate scenarios using data available from the National Communications and National Met service, for the east and western coastal zones.	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3. Establish a map of inundate-able zones in 4 coastal regions	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	4. Training on and development of a production systems outlook for 2050 for the top non-rice agricultural value-chains: fisheries, cassava,peanuts, banana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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	<i>1.2 A coordinating mechanism for climate change adaptation is established in project sites (in Menabe, Boeny, Vatovavy Fitovinany and Atsinanana)</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	5. Create a coordination mechanism (in Antsinanana, Vatovavy Fitovinany and Boeny) for adaptation and ICZM at the regional level building on existing coordination platforms (including national ICZM platform); integrate adaptation issues into the existing coordination mechanism in Menabe.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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	1.3 Comprehensive adaptation plans developed for four coastal regions (in Menabe, Boeny, Vatovavy Fitovinany and Atsinanana).	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	6. Identify recommended adaptation actions at regional level on the basis of activities 1, 2, 3 and 4.	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-
	7. Develop 4 regional ICZM strategies, inclusive of coastal adaptation plans, in a participatory manner through the coordination mechanisms established in activity 5.	-	-	-	-	-	-			-	-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-			-	-	-	-	-	-	-	-	-	-	-	-
2. Coastal rehabilitation and management for long-term resilience	<b>2. Restored and protected coastal zone</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2.1 Shorelines are rehabilitated through restoration of protective ecosystem services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	8. Conduct a participatory study on the cost-effectiveness, gender dynamics and resilience of proposed alternative livelihoods activities		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	9. Replant and rehabilitate a total of 1200 ha of mangroves in Boeny and Menabe (including the cost of preliminary studies)	-	-	-	-	-	-	-					-	-	-	-	-	-	-	-	-
	10. Undertake shoreline stabilization in a total area of 300 ha along major protection infrastructure and coastal assets (2 km in Toamasina and 1 km in Manakara) (including cost of EIA)	-	-	-	-	-	-	-			-	-	-	-	-	-	-	-	-	-	-
	2.2 Sustainable natural resource use practices and alternative livelihoods introduced in project sites	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	11. Develop new fisheries calendars with local fishing communities and industries (incl. shrimping) on a pilot basis in two western regions	-	-	-	-	-	-	-	-	-	-	-			-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-			-	-	-	-	-	-	-
	12. Develop community-based natural forest regeneration, including community woodlots, and conservation plans	-	-	-	-	-	-	-					-	-	-	-	-	-	-	-	-
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	-	-	-	-	-	-	-					-	-	-	-	-	-	-	-	-	
	13. Awareness raising among coastal communities on coastal deforestation and sustainable land management	-	-	-	-	-	-	-	-	-	-	-					-	-	-	-	

	14. Introduce improved fish & crab production and techniques (e.g. mariculture) in Mahanjanga II, Belo sur Tsiribihina, Mahanoro, and Vatomandry Communes of Boeny, Menabe and Antsinanana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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	15. Introduce technologies and assets for promotion of beekeeping in and around mangroves in Bemanonga & Tsimafana communes (Menabe) and Mangatsiotra and Antsary communes (Vatovavy Fitovinany)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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	16. Promote diversification of crops and climate-smart agriculture, such as vegetable production, improved crop varieties, improved cultivation techniques, in 8 communes in the four regions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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	17. Work with local communities to develop and implement investment plans to promote mangrove-based ecotourism in Boeny, Menabe and Vatovavy Fitovinany	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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	<i>2.3 Technologies for protection and rehabilitation of coastal productive assets are demonstrated adjacent to restored ecosystems.</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	18. Construction and rehabilitation of 1 km sea wall in Manakara be (Vatovavy Fitovinany) including feasibility study and EIA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	19. Restore and complete the existing system of protection combining groyne and sea walls in City of Toamasina (1.1 km), including feasibility and EIA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	<b>3. Climate change adaptation measures are mainstreamed into national and sectoral development strategies, and in non-state stakeholder actions.</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
3. Upscaling and mainstreaming adaptation measures into national ICZM policies and	3.1 Training provided to increase institutional capacity of government officials to develop resilient standards, legislative instruments, norms and sectoral plans	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	20. Develop and implement a training programme on integrating environmental and climate change concerns into legislation and regulation for national and regional	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	





## APPENDIX 5- COSTED M&E PLAN

COSTED M&E PLAN			
M&E activity	Responsibility	Budget US\$ Excluding project team staff time	Time frame
Inception Workshop	<ul style="list-style-type: none"> <li>▪ Project Coordinator</li> <li>▪ UNEP</li> <li>▪ CTA</li> <li>▪ M&amp;E Clerk</li> </ul>	\$3,000	Two months after project approval
Inception Report	<ul style="list-style-type: none"> <li>▪ Project Coordinator</li> <li>▪ CTA</li> <li>▪ M&amp;E Clerk</li> </ul>	None	One month after Inception Workshop
Baseline Study	<ul style="list-style-type: none"> <li>▪ Project Coordinator</li> <li>▪ CTA</li> <li>▪ UNEP</li> <li>▪ M&amp;E Clerk</li> </ul>	\$ 45,000	No more than 6 months after project start.
Measurement of Means of Verification for Project Progress on output and implementation	<ul style="list-style-type: none"> <li>▪ Oversight by Project Coordinator</li> <li>▪ Project team</li> <li>▪ M&amp;E Clerk</li> </ul>	To be determined as part of the annual work plan preparation	Annually prior to PIR and to the definition of annual work plans
Periodic monitoring of implementation progress	<ul style="list-style-type: none"> <li>▪ Project Coordinator</li> <li>▪ M&amp;E Clerk</li> </ul>	None	Quarterly
Periodic Progress reports	<ul style="list-style-type: none"> <li>▪ Project Coordinator</li> <li>▪ M&amp;E Clerk</li> </ul>	None	Quarterly
Project Implementation Review (PIR)	<ul style="list-style-type: none"> <li>▪ PC</li> <li>▪ CTA</li> <li>▪ UNEP</li> <li>▪ M&amp;E Clerk</li> <li>▪ FMO</li> </ul>	None	Annually
Mid term Review/ Evaluation (MTR/MTE)	<ul style="list-style-type: none"> <li>▪ UNEP TM/UNEP evaluation office</li> <li>▪ External Consultant</li> <li>▪ M&amp;E Clerk</li> <li>▪ Project Coordinator</li> </ul>	\$35,000	Mid way through project implementation.
Terminal Evaluation	<ul style="list-style-type: none"> <li>▪ UNEP Evaluation office</li> </ul>	\$35,000	Close to the end of project implementation
Project Terminal Report	<ul style="list-style-type: none"> <li>▪ Project Coordinator</li> <li>▪ M&amp;E Clerk</li> </ul>	None	At least three months before the end of the project

<b>COSTED M&amp;E PLAN</b>			
<b>M&amp;E activity</b>	<b>Responsibility</b>	<b>Budget US\$ Excluding project team staff time</b>	<b>Time frame</b>
Audit	<ul style="list-style-type: none"> <li>▪ Government</li> <li>▪ Project manager</li> <li>▪ M&amp;E Clerk</li> </ul>	Indicative cost : 3,500 USD per year (17,000)	Yearly
Visits to the project sites	<ul style="list-style-type: none"> <li>▪ UNEP, Government representatives</li> <li>▪ M&amp;E Clerk</li> </ul>	For UNEP Task Manager it is paid by the IA fees and operational budget.	Yearly
<b>Total Indicative Cost</b>		<b>132,500</b>	

## APPENDIX 6 - SUMMARY OF REPORTING REQUIREMENTS AND RESPONSIBILITIES

SUMMARY OF REPORTING REQUIREMENTS AND RESPONSIBILITIES		
Item	Due date	Responsibility
Inception Report	1 month after project inception meeting	PC, CTA, M&E Officer
Expenditure report accompanied by explanatory notes		PC, CTA, M&E Officer Finance and Admin officer
Cash Advance request and details of anticipated disbursements		PC
Progress report	Half yearly	PC, M&E Officer
Audited report for expenditures for year ending 31 December	Yearly on or before 30 June	Executing partner/
Inventory of non expendable equipment	Yearly on or before 31 January	PC, Financial Officer
Co financing report	Yearly on or before 31 July	PC
Project implementation review (PIR) report	Yearly	PC, UNEP/DGEF
Minutes of project committee meetings	Twice a year (or as relevant)	PC, M&E Officer
Final report	6 months of project completion date	PC, CTA, M&E Officer
Final inventory of non expendable equipment		PC, Financial Officer
Equipment transfer letter		PC, Financial Officer
Final expenditure statement	3 months of project completion date	PC, Financial Officer, UNEP
Mid term review or Mid term evaluation	Midway through project	PC, UNEP , M&E Officer
Final audited report for expenditures of project	6 months of project completion date	MEF

## APPENDIX 7- STANDARD TERMINAL EVALUATION TORS

### Objective and Scope of the Evaluation

The objective of the terminal evaluation is to examine the extent and magnitude of any project impacts to date and determine the likelihood of future impacts. The evaluation will also assess project performance and the implementation of planned project activities and planned outputs against actual results.

### Methods

This terminal evaluation will be conducted as an in depth evaluation using a participatory approach whereby the UNEP/DGEF Task Manager, key representatives of the executing agencies and other relevant staff are kept informed and consulted throughout the evaluation. The consultant will liaise with the UNEP/EOU, the UNEP/DGEF Task Managers on any logistic and/or methodological issues to properly conduct the review in as independent a way as possible, given the circumstances and resources offered. The draft report will be circulated to UNEP/DGEF Task Manager, key representatives of the executing agencies and the UNEP/EOU. Any comments or responses to the draft report will be sent to UNEP/EOU for collation and the consultant will be advised of any necessary or suggested revisions.

### Key Evaluation principles

In attempting to evaluate any outcomes and impacts that the project may have achieved, evaluators should remember that the project's performance should be assessed by considering the difference between the answers to two simple questions "*what happened?*" and "*what would have happened anyway?*". These questions imply that there should be consideration of the baseline conditions and trends in relation to the intended project outcomes and impacts. In addition it implies that there should be plausible evidence to attribute such outcomes and impacts to the actions of the project.

Sometimes, adequate information on baseline conditions and trends is lacking. In such cases this should be clearly highlighted by the evaluator, along with any simplifying assumptions that were taken to enable the evaluator to make informed judgments about project performance.

## **APPENDIX 8 – STANDARD TERMS OF REFERENCE FOR KEY PROJECT STRUCTURES AND PERSONNEL**

### **1. Project Steering Committee (PSC)**

A Project Steering Committee (PSC) will be appointed at the beginning of the project. It will be multi disciplinary and multi stakeholder in its composition and will include members with disciplinary expertise required by the project, as well as representatives of NGO, CBO, the Private Sector, academic institutions and government institutions and departments in sectors relevant to the project, the Ministries of Finance and Agriculture, water, Fisheries, Public Works, Decentralization, representatives from the regions and regional NGOs, and UNEP.

The implementing agency UNEP will be a full fledged member of the PSC, and it will chaired by the PD while the PC will serve as its secretary. The Project Steering Committee will be established by the DWR, and will hold its regular sessions once every six months throughout the project implementation period. Additional meetings may be held if necessary.

The PSC will have the authority to establish sub committees or Task Teams in order to provide sectoral or thematic guidance to project implementation. Task teams will comprise relevant PSC members as well as technical advisors or consultants recruited through the project.

Responsibilities:

- Play an oversight role, and provide support, policy guidance and supervision for the project.
- Examine and approve the project’s annual work plans, budgets and procurement plans,
- Examine and approve all progress, monitoring, evaluation and final reports.
- Facilitate the implementation of the project activities in their respective agencies as appropriate
- Facilitate the integration of project inspired activities into existing programmes and practices.

### **2. Project Director (PD)**

The Director of the Climate Change Directorate (DCC) will serve as the Project Director (PD) and will ensure a continued cohesion between the project and the mandate of the Ministry of Environment and Forests the project executing agency.

Responsibilities

- Play an overall supervisory role on the PCU and ensure that project implementation is effectively and efficiently carried out.
- Follow up on and ensure timely and adequate contributions from the GoM
- Facilitate interactions between the project and high level policy making components – Ministries, Departments and Agencies.
- Maintain close and regular interactions with the UNEP the implementing agency.

### **3. The Project Coordinator (PC)**

The PC will be responsible for the timely and effective implementation of all project components with particular emphasis on: mobilization of project inputs, supervision of project staff, consultants and sub contractors. The PC will head the Project Coordinating Unit, and will be fully accountable to the Steering Committee, the Project Director and UNEP for a satisfactory execution of the project.

Responsibilities:

- Plan project activities and monitor progress against the initial quality criteria;

- Mobilize goods and services to initiative activities, including drafting TORs and work specifications;
- Monitor events as determined in the Project Monitoring Schedule Plan, and update the plan as required;
- Manage requests for the provision of financial resources by UNEP;
- Monitor financial resources and accounting to ensure accuracy and reliability of financial reports;
- Prepare and submit financial reports to UNEP on a quarterly basis;
- Manage and monitor the project risks initially identified, submit new risks to the PSC for consideration and decision on possible actions if required; update the status of these risks by maintaining the Project Risks Log;
- Manage issues and requests for change by maintaining an Issues Log;
- Prepare Project Progress Reports (progress against planned activities, update on Risks and Issues, expenditures) and submit reports to the PSC ;
- Prepare the Annual Review Report, and submit the report to the PSC;
- Prepare Annual Performance Report (APR)/Project Implementation Review (PIR)
- Prepare the AWP for the following year, as well as Quarterly Plans if required.

#### 4. Chief Technical Advisor (CTA)

The CTA will provide technical guidance on various aspects of project implementation including: appropriate methods and approaches for baseline studies and assessments, review and use of the strategic results framework to effectively monitor the project and capture lessons learned, and the contributions of other technical assistance consultants. In other words the CTA will provide technical quality assurance of project activities and outputs. The CTA will work closely with the PC, report to the PD and participate in SC meetings as a resource person.

#### Responsibilities

- Quality assurance and technical review of project outputs (e.g. base studies and other assessments)
- Assist in drafting TORs for technical consultancies and the supervision of hired consultants
- Assist in monitoring the technical quality of project M&E systems, including annual work plans, indicators and targets
- Advice on the most suitable approaches and methodologies for achieving project targets and objectives, including the collection and processing of information and data
- Assist in knowledge management, communications and awareness raising.

#### 5. Finance and Administrative Assistant:

A finance administrative assistant will be hired to assist the PC in finance and administration issues. He/she will work under the supervision of the PC and will be responsible for the following:

- Set up and maintain project files;
- All financial management tasks under the responsibility of the PC
- Collect project related information data;
- Update plans;
- Administer PSC and other relevant meetings;
- Administer project revision control;
- Establish document control procedures;
- Compile, copy and distribute all project reports;
- Review technical reports;

- Monitor technical activities carried out by responsible parties

#### 291. Monitoring and Evaluation Officer

A monitoring and evaluation specialist will be recruited as a consultant to participate in the project's monitoring and evaluation activities on an ongoing basis throughout the project. The M&E Officer will be responsible for ensuring timely and quality reporting on project indicators, monitoring the rate of achievement of project targets, and assisting the project coordinator in producing periodical reports on project implementation. The M&E Officer will be particularly responsible for producing semi-annual narrative reports, PIRs, annual reports, as well as for coordinating and monitoring the baseline study, mid-term and final evaluations.

The various TORs will be refined at the beginning of the inception phase

## APPENDIX 9 - CO FINANCING LETTERS FROM PROJECT PARTNERS



REPUBLIKAN'I MADAGASIKARA  
Fivavaha - Tanindrazana - Fandrosoana

**Le Premier Ministre  
Chef du Gouvernement**

Antananarivo, le

N° -14/PM

à

Madam the CHIEF EXECUTIVE OFFICER  
Global Environment Facility  
Washington D.C., USA

**OBJET:** Co-financing of the project "Adapting Coastal Zone Management to Climate Change considering ecosystem and livelihoods" (ACZM)

Dear Madam,

On behalf of The Government of Madagascar, it is my pleasure to confirm to you our support for the above-mentioned project. The Government, its Ministries and Departments at national and regional level have been actively involved in all phases of this project's design and we are satisfied that it reflects our needs and aspirations with regards to much-needed adaptive action in Madagascar's vulnerable coastal zones.

The proposed project is building on the baseline of ongoing and planned programming in the sectors of water, agriculture, and on the ongoing operations of the various Ministries in each of the four regions concerned. Our co-financing for this project is granted through the National Budget and through various donor-supported programs in the agriculture and fisheries sectors, and represents 11,050,000 US\$ in total co-financing for the duration of the project. We are also building our project on a 1,000,000 US\$ contribution in co-financing from UNEP, as our implementing Agency.

The ongoing programs from which this co-financing was identified are listed in the summary annexed to this letter. These programs are all well aligned to this proposed LDCF-GEF initiative, and seek to achieve complementary objectives on which the ACZM project will build. They provide an estimated \$8,380,000 in grant co-financing. In addition, the proposed ACZM initiative will rely on \$ 2,670,000 in co-financing from the Ministries of Environment and Agriculture, in-kind, through our own assets, personnel, and infrastructure, in the four targeted regions and at national level.

We are confident that the LDCF-GEF grant of US\$ 5,337,500 over six years will serve to demonstrate the benefits of integrated coastal zone adaptation interventions, and the economic relevance of healthy coastal ecosystems, and we look forward to working with the GEF and UNEP and all other partners in this project towards its successful implementation.

With kind regards



*Poul*  
HERIZIKY Jean Omer

*sc*

### Summary of co-financing partners and programs

The International Fund for Agricultural Development (IFAD) is also support the **Programme of Support to the Development of Menabe and Menaky (AD2M)**. This programme, started in 2006 and slated to end in 2014 has a total budget of 21 million US\$. Its aim is to strengthen the policy and institutional and regulatory processes regarding land tenure security and rights to land at national level and in the two targeted provinces. It also promotes the sustainable use of natural resources; capacity building for local governance including the development of regional, communal and local development plans as well as the emergence of local-level capacities and entrepreneurship. The AD2M program has worked to develop capacity on land tenure, land titling and tenure security through technical assistance and training. Furthermore, the program assisted the Menabe region in developing and implementing its Regional Development Plan (PRD) as well as communal development plans (PCD) in light of the Madagascar Action Plan. This program addresses key baseline issues such as watershed degradation and rural poverty. The program also provides direct support for regional level capacity on which this LDCF project will build. The AD2M program is providing \$500,000 in co-financing to this LDCF initiative.

The IFAD-Supported **Rural Income Promotion Programme (PPRR)**, which has the aims of improving small producers' access to markets by strengthening commodity chains, and helping them to capitalize on their produce through partnership contracts. The program creates partnership poles between producers, transporters, processors and traders, and seeks to increase the income and food security of the rural inhabitants of Antsinanana Region (Toamasina area), to enhance the ability of communities to take charge of their own development. The program, implemented through a loan of \$14.5 million, and an OPEC contribution of \$7.7 million, provides \$3,500,000 in baseline co-financing to this proposed initiative. The program focuses on the value chains of capsicum, honey, rice, maize, fish and litchi, working to create producer partnership poles to enhance market access. This program has contributed to creating a baseline of market organization on which the LDCF project can build, particularly as regards the commercialization of products derived from improved or alternative livelihoods.

The IFAD-supported **PROSPERER** program works with the Ministry of Agriculture and the agricultural private sector to assist in the creation and emergence of sound business development services that respond to the needs of small and micro rural enterprises. The program works with individual producers and businesses to identify their individual requirements. The programme also assists in structuring traditional clusters into modern value chains – by line of business, to enable long-term sustainability and market expansion – with linkages to regional growth poles. The program works with rural micro-enterprises, including in four districts of the province, one of which is directly concerned by the LDCF intervention (Manakara, Mananjara, Ifanadiana, Vohipeno). Therefore the program creates basic production capacity on which the LDCF project can build for its work with local communities, as well as a body of knowledge and expertise among the agricultural stakeholders on the most effective and economically profitable livelihoods. The PROSPERER program is providing \$1 million in co-financing to this LDCF initiative. Depending on the outcome of future programming frameworks within IFAD, additional co-financing may be mobilized during the implementation of the project.

- **Management and Conservation of Biodiversity.** Our Ministry works actively, through national and international financing, to protect Madagascar's unique biodiversity. Efforts led by the MEF in this regard include the categorization of at risk biodiversity, management of ecosystems and species through the establishment and management of National parks and Protected Areas. This aspect also includes conservation awareness raising, the development of eco-tourism and the monitoring of ecosystem services on which this project will build in the four targeted regions. Through interventions at national and regional levels, this program provides US\$ 480,000<sup>1</sup> in baseline co-financing to the proposed ACZM initiative.

<sup>1</sup>Please note this does not include any amount received by the GEF for biodiversity conservation initiatives.

- **Forest Management, Protection and Inventory.** Our ministry, through its Direction Générale des Forêts, works to provide census information on the types of forests in Madagascar, mapping services, characteristics of their species and use, measures rates of deforestation, and seeks to develop initiatives with local communities on the conservation of forests on which this project will build in the selected sites, by using MEF established methodologies for co-management. The DGF participates actively in the development of REDD efforts in the country. Through its ongoing efforts to monitor and conserve forests in coastal areas, the Forestry Program contributes an estimated US\$ 1,000,000 in co-financing to the proposed ACZM initiative. In addition, the **Fire Alert System** implemented by the Ministry will also contribute an additional \$200,000 to ensure that coastal forest management takes fire risk into consideration.

- **Natural Resources Knowledge Management.** Our Ministry, through its Direction of Environmental Integration, is working actively to gather and disseminate knowledge, data and information on natural resources in the country. To this effect, the Ministry has created a service of databases and a dedicated documentation service. This initiative will provide support to the efforts of the ACZM project to create ICZM committees regionally, by equipping them with adequate information, and by proposing mechanisms for regional-national linkages. This knowledge management function is also at the heart of mainstreaming efforts, and will serve as a support function to efforts to integrate adaptation in ongoing development planning at national and regional levels. The co-financing contribution from this initiative is US\$ 300,000.

- **Management and Control of Pollutions.** The Ministry works through its regional directorates and at central level to monitor and control pollution at all levels. This includes marine pollution, in particular through the administration of the Law on Pollution by Hydro-Carbons, as well as land-based marine pollution in accordance with prevailing laws. The Ministry also works to control the management of chemical substances through the SAICM initiative, and also works on waste management issues in conjunction with regional administrations. This program provides a baseline on which the ACZM initiative will build, namely by ensuring that rehabilitated ecosystems remain pollution-free, for a more sustainable maintenance of ecosystem services. The co-financing from this program is estimated at \$600,000.

- **Environmental Dashboards.** Through the Office National de l'Environnement (ONE), the Ministry is working on the development of environmental dashboard, which are comprehensive environmental information systems that are published periodically for each region. These dashboards provide data and information on key environmental indicators, to enable the monitoring of progress on environmental services and conditions. The Environmental Dashboards developed by the ONE for each region will provide raw data and information to support the development of ICZM adaptation plans, as well as for the establishment of a coastal monitoring system foreseen by this proposed ACZM initiative. Environmental Dashboards are renewed periodically, and so will make a valuable baseline contribution to the monitoring of environmental resilience as it progresses throughout the project. The co-financing contribution from this initiative is \$800,000 in the four regions for the duration of the project.

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## UNITED NATIONS ENVIRONMENT PROGRAMME

Programme des Nations Unies pour l'environnement    Programa de las Naciones Unidas para el Medio Ambiente  
Програма Окружающего Общества Земли на организационном уровне    برنامج الأمم المتحدة للبيئة

联合国环境规划署



**Reference :** DEPI/GEFCCAU

18 March, 2014

**Subject: UNEP co-financing commitment to the LDCF project "*Adapting Coastal Zone management to Climate Change considering ecosystem and livelihoods*"**

UNEP helps developing countries to reduce vulnerabilities and build resilience to the impacts of climate change. UNEP builds and strengthens national institutional capacities for vulnerability assessment and adaptation planning, and supports national efforts to integrate climate change adaptation measures into development planning and ecosystem management practices. The project entitled "*Adapting Coastal Zone management to Climate Change considering ecosystem and livelihoods*" is built upon and contributes to the on-going projects and programs implemented by UNEP. More specifically, it will be aligned, build upon and provide mutual benefits to the following on-going initiatives:

- The development of ICZM Protocol to the Nairobi Convention aims to promote the use of ICZM approaches for long-term sustainable development of the coastal and marine environment in the WIO region, and to strengthen the application of ICZM tools. The support received by Madagascar in this context includes the development of pilot projects on eco-tourism as well as support for participation in the protocol negotiations. This project is well aligned with these activities particularly the first and third components, which focus on integrating climate change and adaptation measures into policies and more specifically ICZM policies.
- The UNEP-European Commission ENTRP project on 'Building Capacity for Coastal Ecosystem-based Adaptation in Small Island Developing States (SIDS)'. This project seeks to assist countries and regions develop and apply ecosystem-based adaptation approaches to maintain and enhance the resilience of tropical coastal ecosystems and the services they provide to coastal communities in SIDS. Through the project's geographical focus on SIDS in Africa and the Caribbean, the LDCF project is aligned with some of the planning and ecosystem management tools and technical guidance to assist decision-making, as well as through regional capacity building and global transfer of good practices and experiences gained, particularly where mangrove management is concerned.

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DIVISION OF ENVIRONMENTAL POLICY IMPLEMENTATION (DEPI)

P.O. Box 30552-00100, Nairobi, Kenya

Tel: (+254 20) 762 6707

Email: keith.alverson@unep.org



# UNITED NATIONS ENVIRONMENT PROGRAMME

Programme des Nations Unies pour l'environnement    Programa de las Naciones Unidas para el Medio Ambiente  
 Программа Организации Объединённых Наций по окружающей среде    برنامج الأمم المتحدة للبيئة  
 联合国环境规划署



Dr. Naoko Ishii  
 CEO & Chairperson  
 Global Environment Facility  
 1818 H Street, NW  
 Washington DC 20433, USA  
 Email: nishii@thegef.org

Please find below the budgets for the UNEP supported/led projects which the LDCF project will benefit from.

Project/ Network	Budget (US \$)	Duration	Type of co-financing
UNEP-Nairobi Convention	500,000	2013-2017	Grant
UNEP-EC SIDS	500,000	2013-2015	Grant
<b>Total</b>	<b>1,000,000</b>		

This letter serves to confirm UNEP's commitment of **USD 1,000,000** to the above-mentioned GEF LDCF project to provide co-financing through the projects detailed here for the amounts outlined in the table.

We look forward to your continued cooperation.

Yours sincerely,

Keith Alverson

Coordinator, Climate Change Adaptation & Terrestrial Ecosystem Branch

DIVISION OF ENVIRONMENTAL POLICY IMPLEMENTATION (DEPI)

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**APPENDIX 10- ENDORSEMENT LETTER FROM GEF NATIONAL FOCAL POINTS**

**REPOBLIKAN'I MADAGASIKARA**  
*Fitiavana-Tanindrazana-Fahamarinana*

Antananarivo, 10 May 2012

**MINISTRY OF ENVIRONMENT AND  
FORESTS**

**SECRETARIAT GENERAL**

**DIRECTION GENERAL OF  
ENVIRONMENT**

**The GEF OPERATIONAL FOCAL POINT**

**TO**

**Mrs. MARIAM NIAMIR FULLER**  
**Director, GEF Coordination Office**  
**UNEP, Nairobi**

**N° 312 /12- MEF/SG/DGE**

**Subject:** Adapting coastal zone management to climate change in Madagascar considering ecosystem and livelihood improvement

Madam,

In my capacity of GEF Operational Focal Point for Madagascar, I confirm that the above project proposal is (a) in accordance with my Government's national priorities including the priorities identified in the National Adaptation Plan of Action of Madagascar and our commitment to the relevant global environmental Conventions; and (b) was discussed with relevant stakeholders including the global environmental conventions focal points.

I am pleased to endorse the preparation of the above project proposal with the support of the GEF agency listed below. If approved, the proposal will be prepared and implemented by UNEP. I requested the GEF Agency to provide a copy of the project document before it is submitted to the GEF Secretariat for CEO endorsement.

The total financing, (from the GEFTF, LDCF and/or SCCF), being requested for this project is USD 6,013,865 inclusive project preparation grant (PPG), if any, and Agency fees for project cycle management service. The financing requested for Madagascar is detailed in the table below.

Source of Funds	GEF Agency	Focal Area	Amount (in US\$)			
			Project preparation	Project	Fee	Total
LDCF	UNEP	CC	129,650	5,337,500	546,715	6,013,865
(Select)	(Select)	(Select)	0	0	0	0
(Select)	(Select)	(Select)	0	0	0	0
(Select)	(Select)	(Select)	0	0	0	0
<b>Total GEF resources</b>			<b>129,650</b>	<b>5,337,500</b>	<b>546,715</b>	<b>6,013,865</b>

Sincerely



**RALALAHARISOA Christine Edmée**  
Director General of Environment

## APPENDIX 11 - DRAFT PROCUREMENT PLAN

The LDCF funds will be disbursed through contracts or Letters of Agreement (LoA) between UNEP and the individual consultants, in accordance with UNEP rules and procedures. The project executing organization and local partner institutions will contribute to the various project components depending on their respective expertise and financial capability.

Definitive allocations, by project components, will be finalized during the inception phase of the project, depending on the final allocation of tasks between partners. The Table below specifies the Technical Assistance consultancies planned for local and international consultants, as well as major goods acquisitions planned.

				Total	
Procurement Plan					
<b>12 CONSULTANTS</b>		<b>Rate/Unit</b>	<b>Unit(s)</b>	*	
		<b>daily rate inclusive of travel (25%)</b>			<i>All consultancies are calculated on the basis of lump sum agreements inclusive of 25% of travel.</i>
1201	IC - VA Trainer	688	60	41,250	Costs of training for local government authorities on CCA and VA in Coastal Zones and perform 4 CC VRA studies using participatory vulnerability assessment tool DIVA (DINAS-Coast) and VIA guidelines (PROVIA)
1202	IC - climate modelling specialist	688	20	13,750	Consultant to support the development of an assessment of CC impacts to coastal ecosystems and their services for the four regions and to assist in the development of downscaled climate scenarios using data available from the National Communications and National Met service, for the east and western coastal zones. .
1203	NC - climatologists (2)	313	60	18,750	Consultants to perform downscaled climate scenarios using data available from the National Communications and National Met service, for the east and western coastal zones.
1204	NC - land use planner	313	40	12,500	Consultant to establish a map of inundate-able zones in 4 coastal regions
1205	NC - Hydrologist	313	40	12,500	Consultant to establish a map of inundate-able zones in 4 coastal regions

1206	IC - Production systems outlook specialist	688	65	44,688	International Consultant to develop and deliver training on and development of a production systems outlook for 2050 for the top non-rice agricultural value-chains: fisheries, cassava,peanuts, banana
1207	NC - agriculture specialists (2)	313	235	73,500	National Consultants to develop and deliver training on and development of a production systems outlook for 2050 for the top non-rice agricultural value-chains: fisheries, cassava,peanuts, banana
1208	NC - coastal zone governance experts (2)	313	120	37,500	National consultants to support the creation of a coordination mechanism (in Antsinanana, Vatovavy Fitovinany and Boeny) for adaptation and ICZM at the regional level building on existing coordination platforms (including national ICZM platform);and to integrate adaptation issues into the existing coordination mechanism in Menabe.
1209	NC - coastal adaptation specialist	313	100	31,250	National consultants to support the creation of a coordination mechanism (in Antsinanana, Vatovavy Fitovinany and Boeny) for adaptation and ICZM at the regional level building on existing coordination platforms (including national ICZM platform);and to integrate adaptation issues into the existing coordination mechanism in Menabe.
1210	NC - adaptation planning specialist (4)	313	108	33,875	National consultants to identify recommended adaptation actions at regional level on the basis of vulnerability assessments, models and studies under activities 1,2,3 and 4
1211	IC - Chief Technical Advisor	688	179	123,000	Chief technical advisor for the project
1212	NC - Coastal Fisheries specialists	313	310	96,875	National fisheries specialist to negotiate new fishing calendars and assist in the implementation of sustainable fisheries practices

1213	NC-Community-based forest management specialist	313	162	50,625	National consultant to support the development of sound forest management practices, including development of woodlots, reduced deforestation in mangroves
1214	NC-Agronomers (4)	313	640	200,000	National Experts to promote diversification of crops and climate-smart agriculture, such as vegetable production, improved crop varieties, improved cultivation techniques, in 8 communes in the four regions
1215	NC - beekeeping specialists	313	280	87,500	National experts to support the development of beekeeping
1216	IC - climate change policy and planning specialist	688	70	48,125	International consultant to develop and implement a training programme on integrating environmental and climate change concerns into legislation and regulation for national and regional parliamentarians and district/regional administrations
1217	NC - governance specialist	313	80	25,000	National consultant to develop and implement a training programme on integrating environmental and climate change concerns into legislation and regulation for national and regional parliamentarians and district/regional administrations
1218	IC - climate change training specialist	688	40	27,500	International consultant to develop and implement a series of sectoral training programmes on climate change adaptation (agriculture, tourism, infrastructure, water, fisheries and forestry).
1219	NC - climate change training specialist	313	120	37,500	National consultant to develop and implement a series of sectoral training programmes on climate change adaptation (agriculture, tourism, infrastructure, water, fisheries and forestry).
1220	NC - EIA specialist	313	60	18,750	National consultant to help revise EIA texts and procedures

1221	IC - climate change law specialist	688	40	27,500	IC to help revise the fisheries law and the protected areas law to take into account the results of vulnerability studies and adaptation measures identified in Component 1
1222	NC - legal and governance experts	313	120	37,500	NC to revise the fisheries law and the protected areas law to take into account the results of vulnerability studies and adaptation measures identified in Component 1
1223	NC - government planning experts	313	120	37,500	National experts to revise regional development planning frameworks in 4 coastal regions to integrate climate change resilience and adaptation concerns.
1224	NC - ICZM planning experts	313	120	37,500	National experts to review and revise the national ICZM strategy and policy, in light of regional strategies developed in component 1, working with the national ICZM committee.
1225	IC - ICZM expert	688	40	27,500	International Consultant to help review and revise the national ICZM strategy and policy, in light of regional strategies developed in component 1, working with the national ICZM committee.
1226	NC - government finance expert	313	90	28,125	National expert to support the development of a strategy to explore opportunities for upscaling and financing coastal adaptation including through public-private partnership and financing.
1228	Regional Technicians (4)	187.5 per trimester per person	307	114,640	Regional technicians serving as focal points for the project in each region, seconded from MEF
1229	NC - ecologist	313	160	50,000	Ecologists to complete an assessment of CC impacts to coastal ecosystems and their services for the four regions.
1230	NC - communications specialist	313	192	60,000	National communications advisor to design and deploy an outreach and awareness raising campaign at regional and national level (for general public)

1231	IC - climate change and agriculture specialist	688	120	82,500	International consultant to help promote diversification of crops and climate-smart agriculture, such as vegetable production, improved crop varieties, improved cultivation techniques, in 8 communes in the four regions
1232	NC - tourism specialist	313	80	25,000	NC to support the implementation of sustainable ecotourism practices
1232	IC - ecotourism expert	688	80	55,000	International expert on ecotourism development
<b>1299</b>	<b>SUB TOTAL</b>			<b>1,560,203</b>	
0	-			-	
<b>20 SUB-CONTRACTS COMPONENT</b>				-	
<b>2200</b>	<b>Sub-contracts (MOUs/LOAs for supporting organizations)</b>			-	
2201	Sub-contract NGO mangrove rehabilitation	lump sum		144,000	Sub-contract with an NGO for mangrove rehabilitation inclusive of EIA costs
<b>2299 SUB-TOTAL</b>				<b>144,000</b>	
0				-	
<b>2300</b>	<b>Sub-contracts (for commercial purposes)</b>			-	
2301	sub-contract shoreline revegetation	lump sum		16,400	Sub-contract for undertaking shoreline revegetation inclusive of EIA costs
2302	Sub-contract consultancy firm	lump sum		35,000	Sub-contract for undertaking a participatory study on the cost effectiveness, gender dynamics and resilience of proposed alternative livelihoods options
2304	sub-contract coastal engineering firm	lump sum		1,120,000	Sub-contract for the rehabilitation of the sea wall, inclusive of EIA costs
2305	sub-contract coastal engineering firm	lump sum		700,000	Sub-contract for the restoration and completion of the existing system of protection combining groyne and sea walls in City of Toamasina (1.1 km), including feasibility and EIA
<b>2399 SUB-TOTAL</b>				<b>1,871,400</b>	
<b>2999 COMPONENT TOTAL</b>				<b>2,015,400</b>	

<b>40 MATERIALS AND EQUIPEMENT COMPONENT</b>				-	
<b>4100 EXPENDABLE EQUIPMENT</b>				-	
4105	reforestation materials	n-a		30,000	Biomass and materials for reforestation
<b>4199 SUB-TOTAL</b>				<b>30,000</b>	
<b>0</b>				-	
<b>4200 NON-EXPENDABLE EQUIPMENT</b>				-	
4201	materials and equipment (ecotourism)	n-a		70,000	materials and equipment for installation of ecotourism facilities
4202	Vehicle and maintenance for supervision of works	n-a		173,000	vehicle for project works supervision with annual maintenance and repair costs
4203	Materials and equipment (resilient agriculture)	n-a		240,000	materials, equipment and implements for the implementation of resilient agricultural practices
4205	Beekeeping equipment	n-a		100,000	beekeeping materials
4208	Fisheries materials	n-a		150,000	fisheries materials, including nets, boats, traps, etc
<b>4299 SUB-TOTAL</b>				<b>733,000</b>	
<b>4999 COMPONENT TOTAL</b>				<b>763,000</b>	

Definitive fund allocations for the procurement of non expendable equipment will be made during the inception period. The following are costs estimates.

## **APPENDIX 12 - TRACKING TOOLS**

See AMAT separate file

## **APPENDIX 13 - REPORTS FROM THE CONSULTATIONS**

Consultations during the project development phase occurred in multiple stages. A first inception workshop was held in March 2013 where representatives from the four regions participated, as well as key NGOs, development partners and sectoral ministries. The first workshop selected the project sites, provided some priority activities to be discussed under each component and an overview of the ongoing activities and frameworks on coastal zone management.

Following this consultation, the consultants team, comprised of four national consultants, undertook bilateral discussions with key ministries the Capital, to gather key elements of information. The consultants teams were then split up into two teams and each team visited two of the project regions. Interview and information collection protocols were developed to ensure all teams gathered elements relevant to all four themes (ecosystems, livelihoods, infrastructures, governance). The consultations in each region began with visits to the regional headquarters and head of regional planning organizations, as well as key technical ministries represented at regional level, including: infrastructure and public works, meteorology, agriculture, environment, water, health, education and social services. The consultants also met with representatives of NGOs and local associations, and performed physical observation of project sites to gather key baseline data.

The following pages provide a short summary of consultations in each region, as well as the interview and data gathering questionnaires and the inception report. The information gathered was then synthesized and presented in four detailed thematic reports (see Appendix 15).

***Gestion des zones côtières (ZC) adaptée au changement climatique, à Madagascar  
considérant l'écosystème et l'amélioration des moyens de subsistance (MEF/DCC)***

***RAPPORT DE CONSULTATION***

**Élaboré par** : Equipe Ecosystème & Moyens de subsistance

**Régions cibles** : Menabe et Boeny

292. Déroulement des consultations auprès des parties prenantes

Les collectes d'informations et les rencontres avec les parties prenantes ont été effectués en trois étapes. Cette démarche a été adoptée dans le but d'avoir des informations précises et priorisées. Compte tenu de l'envergure de chaque région et de la spécificité des informations requises, les consultations avec les parties prenantes se sont déroulées entre Juin et Octobre 2013.

293. Consultation au niveau national (Antananarivo) à travers des interviews avec les personnes ressources.

294. Consultation au niveau régional : Régions Menabe et Boeny (suivant la répartition convenue durant la réunion tenue avec la Direction Changement Climatique et l'équipe chargée du thème infrastructure et gouvernance) à travers des interviews et des réunions.

295. Consultation au niveau local : le choix des sites pour les consultations avec les communautés locales ont été basé sur les résultats des consultations effectuées au niveau régional mais également sur le fait d'assurer une synergie entre les actions sur les écosystèmes et les moyens de subsistance).

296. Résultats clés des consultations au niveau des parties prenantes

297. Au niveau national

298.

La rencontre avec les parties prenantes basée à Antananarivo a ciblé principalement les acteurs œuvrant dans le domaine des zones côtières et l'adaptation au changement climatique incluant les services techniques et les organismes/institutions. Les principaux acteurs rencontrés ont été les suivants tenant compte des répartitions déjà effectuées avec l'équipe infrastructure et gouvernance:

299. Services techniques : Ministères de l'Environnement, Pêche, Eau et Agriculture, Direction Générale de la Météorologie.

300. NGO/Institutions : WWF, GIZ, Conservation International, ICPM, Asity Madagascar, Comité Nationale GIZC, Blue Ventures, WCS/Rebioma.

**Points saillants de la consultation**

La consultation avec ces acteurs a surtout permis d'avoir des informations générales sur les actions menées au niveau national mais surtout au niveau des régions cibles et une orientation sur les parties prenantes clés à rencontrer sur terrain.

### 301. Au niveau régional

Basé sur les résultats des rencontres au niveau d'Antananarivo, la descente sur terrain a été menée en parallèle au niveau des deux régions. La consultation au niveau des régions a été menée en deux étapes : une interview individuelle et une réunion avec les parties prenantes clés. Les entités rencontrées sont ceux qui travaillent étroitement avec les communautés au niveau de leur zone d'intervention, donc connaissent bien les problématiques des communautés des zones côtières des deux régions.

### 302. Région Menabe

303. **Interview des parties prenantes clés** : la première interview a été réalisée au niveau des autorités locales de la Région Menabe (SG, DDR, DRDR, GTDR) ainsi que les membres du bureau du CR GIZC. Ces derniers ont orientés vers les parties prenantes clés ouvrant dans les zones côtières et sur les thèmes spécifiques du projet :

304. Services techniques : Directions Régionales de la Pêche, Environnement et Forêts, Population, Tourisme, Météorologie et Agriculture, Office Régional du Tourisme.

305. ONG/Institutions : Blue Ventures, WWF, CNFEREF, SARAGNA, DWCT, Fanoitra, FRDA, Code Menabe, A2DM, Louvain Développement, Fanamby, Madagascar National Parks, SAGE.

306. **Réunion avec les parties prenantes**: Notre descente sur terrain a coïncidé avec la réunion du Comité Régionale GIZC, donc nous avons profité de cette occasion pour du projet avec les membres de cette plateforme régionale sur les zones côtières.

307. **Points saillants de la consultation** : Grâce au renforcement de capacité menée par WWF au niveau de la région Menabe, les acteurs ont eu une connaissance de base sur l'adaptation au changement climatique mais les actions sur terrain demeurent encore insuffisantes. Les parties prenantes de la région sont également dynamiques grâce à l'existence du CR GIZC. Les propositions se concentrent surtout sur la restauration des mangroves et la diversification des activités génératrices de revenu des communautés locales (valorisation des filières porteuses, promotion de l'écotourisme communautaire, etc.).

### 308. Région Boeny

309. **Interview des parties prenantes clés** : la première interview a été tenue avec le SG de la région qui a orienté vers les autres acteurs :

310. Services techniques : Directions Régionales de la Pêche, Environnement et Forêts, Agriculture et Tourisme.

311. ONG/Institutions: Blue Ventures, FOFIFA, SAGE, PNRC, ENEM, CCMA, GIZ.

312. **Réunion avec les parties prenantes** : Durant notre descente sur terrain, une réunion a été organisée par la DCC regroupant les autorités régionales et les services techniques de la Région Boeny pour réfléchir sur les sites potentiels pour le projet mais également pour collecter les informations nécessaires pour le document du projet. Les principaux participants étaient : DGE, DCC, Directions Régionales de l'Environnement et Forêts, Pêche, Tourisme, Santé, Agriculture, Eau.

313. **Points saillants de la consultation** : la connaissance sur le changement climatique est très limitée dans la Région, seul le GIZ commence à adresser ce problème ainsi que le

DREF. Les principales propositions regroupent surtout la restauration des mangroves, l'amélioration des techniques de pêche et agricoles, et l'identification des alternatives.

#### 314. Au niveau local

Suite aux consultations régionales et à une meilleure connaissance des problématiques de chaque région et des sites potentiels, une série de consultation locale a été réalisée.

#### 315. Région Menabe

Les consultations ont été menées au niveau de deux districts : Morondava (Communes Morondava et Bemanonga) et Belo sur Tsiribihina (Communes de Belo sur Tsiribihina et Tsimafana). Les principales cibles étaient les communautés de pêcheurs, d'agriculteurs, mixtes incluant celles effectuant d'autres activités. Les discussions ont également tenues avec les associations et organisation existantes dans les communes (OPCI, associations d'agriculteurs, pêcheurs, femmes).

**Points saillants de la consultation :** Les communautés perçoivent des impacts sur leurs moyens de subsistances clés. Les MSUB alternatives proposés sont principalement l'apiculture, l'aviculture, la transformation des produits halieutiques, l'amélioration des techniques de production des crabes et l'écotourisme communautaire au niveau des mangroves.

#### 316. Région Boeny

Les consultations ont été menées au niveau de deux districts : Mahajanga I (Communes Boanamaray, Ampitsopitsoka et Belobaka) et Mahajanga II (Commune Amborovy et Antsanitia). Les cibles sont identiques à celle de la région Menabe (sauf OPCI qui n'existe qu'au niveau de Menabe).

**Points saillants de la consultation :** l'aquaculture de crabe, l'élevage de ver à soie, la culture maraîchère, la pisciculture, l'apiculture, l'amélioration des techniques de production de pêche et agricoles.

# Rapport de consultations sur terrain

*Projet : Gestion intégrée des zones côtières face au changement climatique compte tenu des écosystèmes et des moyens d'existences*

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Équipe RAKOTOBÉ Henri

317. Méthodologie de consultation des parties prenantes

318.

Les parties prenantes ont fait l'objet d'entretiens directs orientés vers les différents thèmes : Gouvernance, Infrastructures, Livelihood et Écosystèmes.

Les fiches d'enquêtes ont été établies pour ce faire, à titre de guide d'entretien avec les personnes contactées (Cf annexes de notre rapport intermédiaire).

Les personnes contactées ont été ciblées préalablement et des rendez vous ont été obtenus bien avant la descente sur terrain, de même pour les entretiens effectués au niveau central. Les détails de ces informations sont annexés dans la deuxième partie de ce rapport. Toutefois à travers les descentes sur terrain et les différentes interviews, les personnels de l'administration et la communauté, il a été déduit les constats suivants :

## **I. Synthèse thématique des enquêtes auprès des parties prenantes**

### **a) Sur le plan gouvernance**

Il n'existe pas de mécanisme de coordination spécifique au projet d'adaptation au changement climatique. Ce sont des projets classiques de développement sans tenir compte suffisamment de l'intégration des dimensions changement climatique dans ces référentiels. Cette situation justifie la création de plateforme de concertation à partir de structures déjà existantes et sous l'égide de la Direction Régionale de l'Environnement et des Forêts (DREF)

Il est proposé que la région s'occupe spécifiquement de la coordination régionale de tous les projets (leur rôle d'aujourd'hui) tandis que la direction régionale de l'environnement et des forêts a la responsabilité spécifique de l'intégration des dimensions de changement climatique dans les différents projets de développement régional. Les renforcements de capacités sont également préconisés suivant les différents modules contenus dans le rapport intermédiaire. Par ailleurs, sur le plan législatif et réglementaire, certains textes sont en cours d'actualisation et dans lesquels il faudrait intégrer les dimensions climatiques, etc...

### **b) Sur le plan des infrastructures**

Le choix de l'administration ainsi que des communautés est prioritairement porté sur la réhabilitation des côtes. Des procès verbaux sur ce point a été établis avec la Direction du Changement Climatique lors de la deuxième descente dans la région Antsinanana.

Ce choix de la communauté local a été traduit techniquement par :

- Construction and réhabilitation des murs de protection (1km) ; Manakara B, 5m au dessus du zéro hydrographique et sur 1km de long :

- Restaurer et compléter le système existant de protection en combinant épis et murs de protection: Ville de Toamasina de Analakininina – Hopitaly be en passant par Lycée Rabemananjary Salazamay et se termine à Ampanalana. (1.1km) :

### **c) Sur le plan des moyens d'existence**

Selon les désirs de la communauté locale, il est demandé au projet de procéder à l'appui aux activités suivantes :

- L'élevage de poissons en cage ( Mahanoro et Vatomandry)
- Reboisement de Mangroves et promotion de l'écotourisme (Mangatsiotra et Antsary)
- Promotion de l'apiculture en mangroves (Mangatsiotra et Antsary, Boeny Baly)
- Techniques de promotion de crabe amélioréesComplexe (Betsiboka Mahajamba)
- Diversification de culture (Betsiboka Mahajamba et Boeny Baly)
- Écotourisme basé sur la mangrove

### **d) Sur le plan des écosystèmes**

La communauté a proposé les activités suivantes moyennant quelque amélioration technique :

- Replantation et réhabilitation des mangroves (1800 Ha) Betsiboka Mahajamba et Boeny Baly : 1200 ha au total
- Stabilisation des rives en utilisant des espaces de revégétalisation (400 Ha) : Ville de Toamasina City of Toamasina de Analakininina – Hopitaly be en passant par Lycée Rabemananjary Salazamay et se termine à Ampanalana (2Km<sup>2</sup>) ; Vatovavy Fitovinany : le long des murs de protection (1km<sup>2</sup>).

### III. Compte rendu d'entretien

<b>Organismes consultés</b>	<b>Points saillants des interviews</b>
<b>I/ Au niveau central</b>	
Ministère de l'Environnement et des Forêts	<ul style="list-style-type: none"> <li>- Problématique de coordination de projet d'adaptation au changement climatique</li> <li>- Structure préconisée au niveau régional</li> </ul>
Ministère de l'Agriculture	<ul style="list-style-type: none"> <li>- Niveau d'intégration de la dimension climatique dans les politiques de développement agricole</li> <li>- Mise en œuvre des programmes au niveau régional</li> </ul>
Ministère des Travaux publics	<ul style="list-style-type: none"> <li>- Existence de normes de construction tenant compte des dimensions climatiques</li> <li>- Non implication dans les normes de protection des côtes dans la mesure où cela ne rentre pas dans leurs attributions</li> </ul>
Ministère de l'Eau	<ul style="list-style-type: none"> <li>- Attributions limitées à l'eau potable</li> </ul>
Ministère du tourisme	<ul style="list-style-type: none"> <li>- Impact du changement climatique dans le développement des activités touristiques</li> </ul>
Direction nationale de la Météorologie	<ul style="list-style-type: none"> <li>- État actuel des projets de la Direction de la météorologie en termes d'infrastructures et de prévision météorologique (Stations et modèles de prévisions climatiques)</li> <li>- Prestations de services selon la demande des clients</li> </ul>
CPGU	<ul style="list-style-type: none"> <li>- PUPIRV (Projets d'Urgences pour la Préservation des Infrastructures et Réduction de la Vulnérabilité)</li> <li>- Amélioration du système d'alerte cycloniques et aux inondations</li> <li>- Matériels de réponses aux urgences</li> <li>- Projets sur la collecte d'informations post catastrophes</li> </ul>
Comité National pour la Gestion Intégrée des Zones Côtières (CN GIZC)	<ul style="list-style-type: none"> <li>- Politique et stratégie de développement durable des zones côtières et marines de Madagascar</li> <li>- Plan d'actions national pour la gestion intégrée des zones côtières et mise en œuvre au niveau régional</li> </ul>
Vice primature en charge du développement et de l'aménagement du territoire (VPDAT)	<ul style="list-style-type: none"> <li>- Plan d'aménagement tenant compte des dimensions climatiques</li> </ul>
ICPM	<ul style="list-style-type: none"> <li>- Intégration du changement climatique dans la réduction des risques et catastrophes dans le littoral Est de Madagascar</li> </ul>
JICA	<ul style="list-style-type: none"> <li>- Domaine d'activités et critères d'éligibilité des projets</li> <li>- Possibilité de financement</li> <li>- Projet en cours</li> </ul>
WWF	<ul style="list-style-type: none"> <li>- Domaine d'activités et critères d'éligibilité des projets</li> <li>- Possibilité de financement</li> <li>- Projet en cours</li> </ul>
World Bank	<ul style="list-style-type: none"> <li>- Domaine d'activités et critères d'éligibilité des projets</li> <li>- Possibilité de financement</li> </ul>

	- Projet en cours
UNEP	- Domaine d'activités et critères d'éligibilité des projets - Possibilité de financement - Projet en cours
Cercle de Concertation des Partenaires Techniques et Financiers en Environnement (CCPTF E)	- Domaine d'activités et critères d'éligibilité des projets - Possibilité de financement - Projet en cours
<b>II/ Au niveau Régional</b>	
<b>1) Dans les deux régions</b>	
Direction Régionale du Développement Rural De Vatovavy Fitovinany	- Moyens d'existence de la population régionale - Impacts et mesures d'adaptation des projets agricoles face au changement
Direction Régionale de l'Elevage	- Moyens d'existence de la population régional` - Impacts et mesures d'adaptation des projets agricoles
Direction Régionale des Travaux Publics	- Normes de constructions bâtiments, routes, ... et législations et réglementations y afférentes
Direction Régionale de la Pêche et des Ressources Halieutiques	- Moyens d'existence de la population régionale - Impacts et mesures d'adaptation des projets agricoles
Direction Régional de l'eau	- Impact du changement climatique sur les ressources en eau - Mesures d'adaptation
Direction Régionale de l'Environnement et des Forêts	- Projets de réhabilitation des côtes et restauration des services éco systémiques - Coordination des projets tenants compte du changement climatique - Priorisation des activités
<b>2) Dans la région Vatovavy Fitovinany</b>	
Secrétariat Général Région Vatovavy	- Visite de courtoisie - État général des projets régionaux
Directeur du Développement Régional	- Visite de courtoisie - État général des projets régionaux - Problématiques et projets et partenaires financiers - Niveau d'intégration des dimensions climatiques
Direction de l'Administration et de la Gestion Territorial	- Visite de courtoisie - État général des projets régionaux - Problématiques et projets et partenaires financiers - Niveau d'intégration des dimensions climatiques
Service Régional de l'Aménagement du Territoire	- Visite de courtoisie - État général des projets régionaux - Problématiques et projets et partenaires financiers - Niveau d'intégration des dimensions climatiques
Direction Régionale de l'Agriculture	- Visite de courtoisie - État général des projets régionaux - Problématiques et projets et partenaires financiers - Niveau d'intégration des dimensions climatiques
Adjoint au PDS	- Visite de courtoisie

	<ul style="list-style-type: none"> <li>- État général des projets régionaux</li> <li>- Problématiques et projets et partenaires financiers</li> <li>- Niveau d'intégration des dimensions climatiques</li> </ul>
ONG MIND	<ul style="list-style-type: none"> <li>- Informations sur les projets de réhabilitation des côtes à Mangatsiotra</li> <li>- Moyens de subsistance</li> </ul>
<b>3) Dans la région Antsinanana</b>	
<b>Mairie:</b> Service Information et communication	<ul style="list-style-type: none"> <li>- Visite de courtoisie</li> <li>- Informations sur les projets en cours et identification des services et personnes à visiter</li> </ul>
Direction de l'Environnement et de l'Urbanisme	<ul style="list-style-type: none"> <li>- Informations sur les projets existants en matière de protection et réhabilitation des côtes</li> <li>- Assainissements de la ville de Toamasina</li> </ul>
Service Projet de Développement	<ul style="list-style-type: none"> <li>- Informations sur les projets de développement incluant les dimensions climatiques de la région</li> </ul>
Direction Régionale du tourisme et de l'Artisanat	<ul style="list-style-type: none"> <li>- Impact du changement climatique dans le développement des activités touristique</li> </ul>
ONG ANAED (Alliance Nationale pour la protection de l'Environnement et pour le Développement)	<ul style="list-style-type: none"> <li>- Données sur les écosystèmes de la région Antsinanana</li> <li>- Projet sur la protection des écosystèmes et de réhabilitation des côtes</li> </ul>
APMF (Association Portuaire, Maritime et Fluviale)	<ul style="list-style-type: none"> <li>- Informations sur les infrastructures portuaires</li> </ul>
Coordonnateur régional de la croix rouge Malagasy	<ul style="list-style-type: none"> <li>- Plan de contingence régional</li> </ul>
<b>III/ Au niveau des communautés locales</b>	
Association des pêcheurs ( Vatomandry et Mahanoro)	<ul style="list-style-type: none"> <li>- Nouveaux moyens de subsistance à promouvoir face au changement climatique</li> </ul>
Communauté locale de Mangatsiotra	<ul style="list-style-type: none"> <li>- Nouveaux moyens de subsistance à promouvoir face au changement climatique</li> </ul>

***Gestion des zones côtières (ZC) adaptée au changement climatique, à Madagascar considérant l'écosystème et l'amélioration des moyens de subsistance.***

***Questionnaires et Guide de collecte d'informations***  
***Thèmes : Ecosystèmes et Moyens de subsistance***

319. INFORMATIONS SUR L'ORGANISME/INSTITUTION

320. Présentation sommaire du projet DCC et de notre mandat

321. Intitulé de l'institution/Coordonnées (email, tél)

322. Est ce que vous travaillez dans les 4 régions suivantes : Boeny, Menabe, Atsinanana, Vatovavy Fitovinany ou certaines d'entre elles ?

323. Quelles sont les actions de votre organisme dans les zones côtières de ces régions?

324. Domaine d'intervention : ex. développement rural, conservation mangrove, renforcement de capacités de gestion des ressources des COBA, alphabétisation, mise en place aire protégée,...

325. Approches : ex. approche participative, top down, co gestion, recherche scientifique,...mais aussi : contrat de prestation,...

326. Zones d'intervention (si possible carte ou coordonnées géographiques, sinon délimitation sommaire)

327. Spécificité de la zone : raison de votre intérêt sur ces zones d'intervention?

328. Depuis quand travaillez vous au niveau de ces zones côtières ?

329. Est ce que vous menez des actions sur le changement climatique au niveau de ces régions? Si oui sur quoi exactement?

330. Quels sont les autres projets ou programmes que vous mettez en œuvre dans la région concernée ?

331. Quelles problèmes, contraintes rencontrez vous en travaillant dans les régions/sites?

332.

333. MOYENS DE SUBSISTANCES (MSUB) – ZONES COTIERES DE LA (S) REGION D'INTERVENTION

334. Informations générales

335. Quels sont les types de MSUB au niveau des régions ou vous travaillez (pêche, tourisme, etc.) ? Combien de personnes utilisent ces moyens d'existence (hommes/femmes) ? Quelle est la contribution de chaque moyen d'existence au revenu familial ?

Moyen d'existence	Nombre de personnes/ /Hommes/Femmes	Revenu moyen saisonnier	Types d'intrants (outils et ressources naturelles)	Produits et valeur
xx				
yy				

336.

337. Quelles sont vos actions relatives à ces moyens de subsistance ?

338. Quelles sont vos projets (titre), sources de financement (bailleurs de fonds), durée de chaque projet (dates et/ou années, début et fin), activités des projets respectifs?

339. Quels sont les principaux problèmes rencontrés par ces moyens de subsistance ie par type de moyens de subsistance existants (pêche, tourisme, etc.)?

Moyen d'existence	Atouts	Faiblesses

340. Quels seraient les moyens d'existence alternatifs possibles dans la région concernée ? Que faudrait il pour les mettre en place ? Quel est leur potentiel économique

341. Perceptions sur les manifestations et impacts probables du changement climatique

342. Avez vous observé des changements au niveau du climat ces dernières années ? Si oui quels sont ces changements et les effets/impacts engendrés en général sur vos (votre) région (s) d'intervention? **Votre communauté ?**

343. Depuis quand ces changements et impacts du CC ont vraiment été perceptibles?

344. Est ce que le changement climatique (CC) affecte les MSUB au niveau des ZC de (s) la région? Sur quels moyens de subsistance spécifiquement (pêche, tourisme, etc.)? De quelles manières? Quels sont les impacts probables ?

Activité/MSUB	Niveau d'impact du CC perçu	Degré de l'impact (faible, moyen, Élevé)	Méthode d'adaptation

345.

346. Avez vous des documents qui donnent des informations sur ces impacts probables ?

347. Propositions de solutions/mesures d'adaptation pour le projet

348. Est ce que vous menez des actions spécifiques sur le changement climatique au niveau vos régions d'intervention (relatives au MSUB)? Quels sont les barrières/contraintes aux actions sur le CC au niveau des MSUB pour ces (cette) région (s) ?

349. Quelles actions proposez vous pour améliorer les MSUB ou la situation socio économique de ces régions/vos sites d'intervention?

350. Quelles actions/mesures d'adaptation pensez vous qu'on devrait proposer pour améliorer les MSUB et la résilience des communautés face au CC?

351. ÉCOSYSTEMES DES ZONES CÔTIÈRES (ECO)

352. Informations générales

353. Caractérisation des écosystèmes (Cartes, recensement)

Écosystème (site)	État (dégradation)	Pressions CC	Pressions maines	Méthodes de médiation

354.

355. Quelles sont vos actions sur les écosystèmes marins et côtiers ?

356. Quels sont vos projets (titre), les sources de financement (bailleurs de fonds), durée de chaque projet (dates et/ou années, début et fin du projet), activités des projets respectifs?

357. Quelles sont les principaux problèmes (y compris menaces et pressions anthropiques) causant la dégradation des écosystèmes des zones côtières (dans les régions/sites concernés)?

358. La population est elle consciente de ces problèmes, et de ses liens avec leurs moyens de subsistance ?

359. Perception sur les manifestations et impacts probables du changement climatique

360. Est ce que le changement climatique (CC) affecte les écosystèmes et les processus écologiques au niveau des ZC de ces régions? Depuis quand ces changements et impacts du CC a été vraiment perceptible? Sur quels écosystèmes spécifiquement (mangroves, estuaires, etc.). De quelles manières?

361. Avez vous des documents qui donnent des informations sur ces impacts probables ?

362. Propositions de solutions/mesures d'adaptation pour le projet

363. Est ce que vous menez des actions spécifiques sur le changement climatique au niveau vos régions d'intervention (relatives aux écosystèmes)? Quels sont les barrières/contraintes aux actions sur le CC au niveau des écosystèmes pour ces (cette) région (s) ?

364. Quelles sont les actions que vous menez /planifiez pour améliorer les écosystèmes (ECO) ou les conditions/processus écologiques de ces sites/régions?

365. Quelles mesures d'adaptation pensez vous qu'on devrait proposer pour renforcer la résilience des écosystèmes côtiers de ces régions?

366. Quelles activités relatives aux écosystèmes côtiers proposez vous pour le projet? Quelles sont les priorités? quels seraient les coûts?

367. AUTRES COMMENTAIRES/RECOMMANDATIONS DE LA PART DE L'INTERVIEWE

368. DOCUMENTS DISPONIBLES AUPRES DE VOTRE ORGANISME/INSTITUTION

Avez vous des documents sur les aspects suivants et pouvons nous avoir ces rapports/données **(données passées et données récentes afin de voir la tendance et l'évolution)** :

369. Documents générales sur les régions, les écosystèmes côtiers de Madagascar

370. Etudes/investigations socio économiques entreprises dans les zones côtières (ZC) des régions

371. Etudes/investigations sur les moyens de subsistance (MSUB) dans les zones côtières des régions.

372. Etudes/investigations écologiques entreprises dans les zones côtières (ZC) des régions

373. Documents informant l'état actuel, l'évolution, l'utilisation, ainsi que sur les impacts des changements climatiques des écosystèmes côtiers des régions

374. Documents pour mieux appréhender les ECO dans les ZC de ces régions/sites? Et aussi les impacts des changements climatiques sur ces ECO

**375.** Informations cartographiques (ou cartes) qui expliqueraient/montretrait les sites avec les principaux ECO, les informations écologiques des régions, etc.

376. Existe t il d'autres entités qui collaborent ou coopèrent avec vous dans ces zones côtières ? Si oui, **qui sont elles** (coordonnées : tél, email, etc.)?

**Préparation du projet du Fonds pour les pays moins avancés (FPMA):**

*Gestion des zones côtières adaptée au changement climatique, à Madagascar, considérant l'écosystème et l'amélioration des moyens d'existence*

**Fiche d'enquête volet infrastructures**

**Informations nécessaires pour la protection des littorales**

- 377. Spécificité des sites
  
- 378. usage des littoraux
  
- 379. Les désordres et/ou perturbations observées (descriptions des états des milieux littoraux appuyés par une carte de vulnérabilité des parties littorales, photographies, coordonnées xyz)
  
- 380. Les causes des désordres et autres perturbations observées, en particulier la part de responsabilité des ouvrages et aménagements littoraux, les forces naturelles influant sur ces vulnérabilités (paramètres climatiques, océanographiques, ...).
  
- 381. Recensement des activités de protection déjà entreprises
  
- 382. Recensement des infrastructures et technologies utilisées pour la protection des littorales de la Région de Boeny et de Menabe (Description, Etat, localisation)
  
- 383. Projet en cours pour la protection du littoral (description, phase de réalisation, indication du site d'intervention par coordonnées sur carte et nom du site, Ressources de financement, organismes responsables)

**3. Propositions**

- 384. Propositions des options de protections du littoral surtout sur les parties vulnérables (description des activités proposées : Réhabilitation ou construction, technologie, localisation du site d'intervention)
  
- 385. Recensement des activités relatives à la protection des sites littorales (consulter surtout le CRGIZC dans la région pour voir son plan d'action régionale, veuillez décrire chaque activité, localisée, cartographiée, les ressources de financement)
  
- 386. Les obstacles qui peuvent entraver la réalisation de ces activités.

## **Informations sur les infrastructures et aménagement des villes**

### 1. Spécificité des sites d'études

- 387. Impacts physiques et économiques du changement climatique sur les infrastructures dans la Région (sur les infrastructures publiques, le système d'irrigation, les habitations, les infrastructures de transports, infrastructures énergies)
- 388. Information sur la qualité de l'eau (acidité, turbidité,...) et l'origine de la dégradation
- 389. Les réglementations en vigueur concernant l'aménagement des villes (notamment sur les zones constructibles)
- 390. Les zones vulnérables aux inondations et cyclones dans la Région (carte de vulnérabilité, ou localisation des sites vulnérables)
- 391. Application des normes de construction (routes et habitats) résistant aux cyclones et aux inondations
  
- 392. Recensement des activités et projets en cours ou déjà entreprises
  
- 393. Les mesures déjà prises compte tenu des impacts du CC sur ces infrastructures (description des activités entreprises, localisation sur carte et nom du site d'intervention, organismes responsables)
- 394. Recensement des infrastructures de protection de l'eau (description, localisation sur carte et nom du site)
- 395. Les activités entreprises compte tenu des impacts du CC sur les infrastructures de transports publiques, les bâtiments administratives, les systèmes d'irrigations, sur le secteur Energie, ...

### 3. Propositions

- 396. Les options d'adaptation suggérées compte tenu des effets du changement climatique sur les agglomérations urbaines majeures et émergentes et pour remédier aux pertes économiques
- 397. Information sur le Coûts de chaque option proposée
- 398. Les problèmes ou obstacles susceptibles d'entraver la réalisation des projets.

## **Information sur les infrastructures et technologies d'adaptation et d'approche pour la Réduction des risques**

- 399. Etats de lieux
  
- 400. Renseignements sur les infrastructures et instruments météorologiques existant dans la Région (mentionner la zone de couverture de cette station météorologique)
- 401. Renseignements sur les technologies de prévision climatique existant dans la Région
- 402. Renseignements sur l'existence de station marégraphique dans la Région
- 403. Renseignement sur l'existence de station hydrométrique
- 404. Renseignements sur les dispositifs de système d'alerte précoce (description, manuel de procédure)
- 405. Information sur la perception du changement climatique dans la Région (variation température, précipitation, fréquence et intensités des catastrophes naturelles, l'inondation et sécheresses)
- 406. Les problèmes et lacunes constatés au niveau des technologies, des infrastructures, capacités techniques pour la prévision climatique et la gestion des risques
  
- 407. Recensements des activités entreprises et projet en cours
  
- 408. Les activités ou projets en cours (description du projet, phase de réalisation, ressources de financement)
- 409. Les études et recherches en cours (description, phase de la recherche)
  
- 410. Propositions
  
- 411. Besoins en infrastructures et technologies selon les organismes et institutions Régionales (description des infrastructures et des nouvelles technologies nécessaires, évaluation des coûts d'installation)
- 412. Besoins en renforcement de capacité technique

**Liste des documents nécessaires (à demander au près des organismes ou institutions :**

- 413. Carte de vulnérabilité (en inondations, en cyclones, des zones littorales, de l'écosystème marin, ...)
- 414. Climatologie spécifique de chaque région concernée
- 415. Les études et investigations déjà entreprises pour la protection des zones littorales vulnérables et/ou Document concernant la protection des zones côtières dans la Région de Menabe et de Boeny
- 416. Cartes indiquant les sites de projets et activités déjà entreprises
- 417. Cartes indiquant les sites de projets et activités en cours
- 418. Plan de développement Régional
- 419. Plan d'urbanisme directeur ou détaillée
- 420. contexte climatique de chaque Région

**Remarques :** Nous tenons aussi à avoir les informations sur les écosystèmes côtiers pour mieux appréhender et choisir les options de protections adéquates (Caractéristiques des écosystèmes, état de dégradation, usage, etc.

**UNEP GEF: ADAPTING COASTAL ZONE MANAGEMENT TO CLIMATE CHANGE  
IN MADAGASCAR CONSIDERING ECOSYSTEM AND LIVELIHHOD  
IMPROVEMENT  
Inception report**

## **1. Executive summary**

The “adapting coastal zone management to climate change in Madagascar” project concept was approved by the GEF in 2012, as part of the NAPA implementation projects supported through the LDCF. In early 2013, the project preparation phase was launched.

The project preparation phase began with an inception workshop, to which the main stakeholders were convened, including representatives of regions potentially included in the project. The purpose of the workshop was to gather preliminary input on project activities and results, define project sites, and to agree on an overall log frame.

At the workshop, participants agreed to include a 4<sup>th</sup> region (Vatovavy Fitovinany) in the project in addition to the 3 regions already targeted in the PIF. This is due to the increased vulnerability of this coastal area over recent years. Since this region was not included in the NAPA studies, the Authorities of the region, together with the Ministry of Environment, mandated a specific coastal vulnerability study to be undertaken in the region, which was discussed at the meeting.

In order to ensure that the addition of a region was considered according to rational criteria, a ranking of sites by vulnerability, using a participatory expert judgement method, was also undertaken at the workshop.

Participants at the workshop also discussed ongoing institutional arrangements for coastal zone management, namely the Integrated Coastal Zone Management Commission at national and regional level, and reiterated their willingness to be active partners in the project. Development partners and NGOs who participated also mentioned their own ongoing work, and it was agreed that a more comprehensive assessment of ongoing work in the project regions would be achieved through the preparatory phase.

Participants also considered the various potential activities that could be included in the project as means to achieve the expected results included in the PIF. It was agreed that this preliminary list would be further tested during the preparatory phase by the consultant team.

A detailed report of the workshop is annexed.

## **2. Initial activities, workshop and consultations**

An International Consultant was appointed in March to lead the consultants team for the design of the project. Four National Consultants are also to be recruited, however the local project design team was not fully operational at the time of the inception workshop, due to administrative delays. It was agreed that as soon as possible, the Ministry of Environment would formalize working arrangements with the consultants. The International Consultant committed to assisting in developing Terms of Reference for the National Consultants.

A tentative workplan was nevertheless discussed with team members who had been tentatively identified by the Ministry, each according to their area of expertise, as attached.

The workplan proposes that the consultations in the region be divided into 2 segments, given the large territory to cover and the potential duration of travel. This workplan proposes that the teams be separated in 2 for the field visits, as time would otherwise not permit that all team members visit each province (this would require at least 1 month in the field). Field consultations of 2 weeks each (1 week per region, by team of two) are therefore tentatively scheduled for May and August, with specific studies and reports to be delivered at set timelines.

The mission had to be cut short due to unforeseen circumstances, and it was agreed that the work would be conducted through skype meetings and email until the next mission could be agreed.

### **3. Inception Workshop**

The inception workshop took place on Monday March 25<sup>th</sup>. It was well attended, with representatives from each of the project's targeted regions, the president of the National ICZM committee, selected NGOs and international partners (World Bank), and representatives from the media. The meeting was opened and Chaired by Mrs Jane Razanamiharisoa

The first part of the workshop provided participants with an overall context and reminder of the project objectives, components and outcomes, as well as an overview of the proposed project preparation phase and calendar. Participants were invited to discuss their relevant ongoing programming in the areas and sectors targeted by the project and confirmed their understanding of the log frame.

There was a round table discussion on ongoing programming, and some questions were raised with regards to co financing, ecosystem rehabilitation, and the status of early warning systems in the regions. It appeared that, in general, early warning systems are not functional in any of the regions targeted by the project, but the extent to which this need would be fulfilled by the project would remain to be refined.

There was a long discussion on the selection of sites. Participants were uneasy with the "de facto" selection of a fourth region to be added into the project: since none of the other regions were invited to participate, participants felt that any further rationalization of the site selection was unnecessary. Following these discussions, the group undertook a site prioritization exercise that resulted in the confirmation of the four project regions as below:

421. Atsinanana

422. Boeny

423. Menabe

424. Vatovavy Fitovinany

In the afternoon, participants discussed the project components and reviewed the outputs that had been listed in the PIF. The group was divided into 4 sub groups, each being tasked with coming up with a list of potential activities that could be used to achieve the project's expected results. These indicative activities will be taken into consideration during the next months consultations and project design.

#### **4. Follow up activities and workplan**

As a matter of priority it was agreed that TORs would be developed for the National Consultants, and that actions would be put in place to ensure the appropriate contracts were in place shortly.

The consultants team discussed a tentative workplan for the next few weeks, based on timelines set in the Terms of Reference and confirmed by the inception workshop.



**SECRETARIAT GENERAL**

**DIRECTION GENERALE DE  
L'ENVIRONNEMENT**

**DIRECTION DU CHANGEMENT  
CLIMATIQUE**



**REPOBLIKAN'I MADAGASIKARA**  
Fitiavana - Tanindrazana - Fandrosoana

RAPPORT DE L'ATELIER DE LANCEMENT DE LA PHASE PREPARATOIRE DU PROJET :

**« ADAPTING COASTAL ZONE MANAGEMENT TO CLIMATE CHANGE IN  
MADAGASCAR CONSIDERING ECOSYSTEM AND LIVELIHHOD  
IMPROVEMENT »**

25 Mars 2013

Relais de la Haute Ville, Antananarivo



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**Adaptation de la Gestion Côtière au Changement Climatique tenant compte des écosystèmes et des moyens d'existence** Projet PANA sur financement FEM – Fonds PMA

Annexe 3 : Présentation PowerPoint 2

**Adaptation de la Gestion Côtière au Changement Climatique tenant compte des écosystèmes et des moyens d'existence** Survol de la phase préparatoire du projet

Annexe 4 : Présentation PowerPoint 3

**Adaptation de la Gestion Côtière au Changement Climatique tenant compte des écosystèmes et des moyens d'existence** Sélection des sites d'intervention

Annexe 5 : Liste des participants

## **I. CONTEXTE DE L'ATELIER**

Dans le cadre de la mise en œuvre du Plan d'Actions Nationales d'Adaptation (PANA), Madagascar bénéficie d'un financement permettant de développer un projet de gestion des zones côtières qui contribue à la réduction de la vulnérabilité de celles-ci face au Changement climatique.

Etant donné que Madagascar est une île, ses zones côtières sont constamment en danger face au changement climatique. Il est donc indispensable de protéger les côtes non encore endommagées et de remettre en état celles qui sont dégradées. Pour cela, il est nécessaire de mettre en œuvre une politique de gestion efficace et durable des zones côtières en impliquant tous les secteurs concernés qu'ils soient publics ou privés.

## **II. OBJECTIFS DE L'ATELIER**

- Identifier les régions susceptibles d'être objets du projet pilote
- Etablir la politique de gestion la plus efficace et durable, capable de faire face aux chocs climatiques et tenant en compte l'amélioration de l'écosystème et de la vie quotidienne de la population

## **III. DEROULEMENT DES TRAVAUX**

L'atelier a débuté à 09h00 par le discours d'ouverture de Mme Jane Razanamiharisoa, chef de service Adaptation au sein de la Direction du Changement Climatique. Ensuite, la consultante internationale, Joana Talafre a commencé son intervention par des mots de bienvenue suivis d'une proposition sur le programme de l'atelier.

Elle a par la suite entamé un bref rappel du projet, à travers des présentations sur le cadre logique du projet, les résultats attendus, le financement, les principales étapes de la phase préparatoire du projet, et la sélection des sites d'intervention.

La première présentation Powerpoint « Adaptation de la Gestion côtière au changement climatique tenant compte des écosystèmes et des moyens d'existence » Projet PANA sur financement FEM – Fonds PMA (*Cf. Annexe 2*) a été axé sur une présentation générale du Projet : son contexte, ses objectifs, les 3 composantes du projet et ses sous composantes, ses zones d'intervention, le financement, et un bref aperçu des éléments constituant la phase préparatoire du Projet, notamment, sa durée, ses objectifs, et le nombre de consultants assignés. Cette première

présentation a été suivie d'une série de questions – réponses sur l'élaboration du projet, le co financement, les secteurs considérés dans « les moyens d'existence », etc.

La deuxième présentation Powerpoint a été un survol de la phase préparatoire du Projet (*Cf. Annexe 3*), notamment un aperçu des principales étapes de la phase préparatoire et du plan de travail comprenant les différentes activités à effectuer durant les 8 mois de préparation et leurs dates d'échéance respectives. Une discussion plénière a ensuite été ouverte sur le plan de travail comprenant des interrogations sur la validation du projet au niveau des régions, des suggestions sur l'importance de sélectionner des sites où il y a déjà des comités GIZC, etc.

A 10h30, une table ronde a été effectuée, dont l'objectif était d'inviter les participants à parler de leurs contributions aux enjeux des zones côtières, à discuter des activités de référence pertinentes, et aux activités en cours dans les régions du projet. Cette table ronde a vu les interventions :

- ✓ D'une responsable du projet « Island » ;
- ✓ Du WWF, présentant deux de leurs projets basés sur la résilience des écosystèmes et des communautés qui en dépendent dans les AMP de Nosy Hara et d'Ambodivaibe ;
- ✓ Du Président du GIZC sur un projet de résilience des infrastructures face aux effets du Changement climatique, notamment les cyclones et l'élévation du niveau de la mer ;
- ✓ D'un représentant de la Région MENABE sur les actions prioritaires à effectuer à Morondava tels que le curage de terrain pour évacuer l'eau de mer pendant les équinoxes, etc.
- ✓ D'un représentant de la Région VATOVAVY FITOVINANY qui a énuméré les impacts actuels du Changement climatique dans sa région, surtout à Manakara, tels que : l'élévation du niveau de la mer, le ravage de certaines côtes de Manakara, la raréfaction de certains produits de mer, la longévité de la période sèche par rapport au calendrier nomade, le bouleversement du calendrier cultural, qui a des conséquences néfastes sur la maturité des fruits, etc. Il a par ailleurs insisté sur l'importance de l'implantation d'un comité GIZC dans leur zone ;
- ✓ D'un représentant de la Région BOENY qui a également cité les effets du changement climatiques dans sa région : la dégradation massive des mangroves, la dégradation des plages, le risque de réduction du pourcentage économique, la diminution de la profondeur du port de Majunga dû à l'érosion de la « Betsiboka », qui verse ses alluvions dans le port,

etc. Il a par ailleurs ajouté l'existence d'ONGs qui effectuent déjà des sensibilisations pour le repeuplement de mangroves dans la Baie de Bombetoka.

- ✓ D'un représentant de la Région ATSIANANA qui a mentionné comme impacts du changement climatique dans sa région : l'extension du bord de mer de Tamatave qui a dégradé les mouvements de la mer, d'où menace d'érosion, le risque de disparition de l'unique Lycée de Tamatave, d'énormes dégâts sur les côtes de la ville, la détérioration des récifs coralliens au niveau du canal de Pangalanes, la raréfaction des espèces animales marines, etc. Il a par la suite affirmé qu'ils espèrent beaucoup du Projet « Zones côtières » car ils ont besoin d'appuis techniques et financiers pour protéger la ville et préserver ses ressources naturelles.

Suite à cela, la consultante internationale a posé deux questions aux participants et que les représentants par région / par institution ont répondu tour à tour.

**Question 1** : Existe t il des ONGs nationales / internationales qui réhabilitent les récifs ?

**Question 2** : Quels sont les systèmes en place pour la prévention des catastrophes naturels ?

Parmi les réponses récoltées :

Les déchets de Sheritt risquent de s'ajouter aux effets du changement climatique pour polluer et dégrader les récifs.

C'est la Direction Générale de la Météorologie qui assure la prévention des catastrophes au sein de la population. Au niveau de Tamatave, il existe déjà un moyen de mesure du niveau de la mer comme système d'alerte à l'élévation du niveau de la mer. Ils n'utilisent cependant pas de sirène d'alerte mais plutôt des drapeaux.

La population locale peut jouer un rôle important dans la prévention des catastrophes naturelles. Mais la plupart d'entre eux ne sont pas conscients des effets du changement climatique, tout autant que les dirigeants. Il est nécessaire de renforcer les capacités institutionnelles.

Après la table ronde, la consultante internationale a entamé la troisième présentation sur le choix des sites d'intervention du projet (*Cf. Annexe 4*), dont l'objectif était d'inviter les participants à entamer une présélection des sites et sous sites d'intervention du projet selon les différentes composantes.

La sélection des sites a vu 2 étapes :

- L'interrogation sur la pertinence des sites qui ont déjà été choisis (Atsinanana, Boeny et Menabe)
- La nécessité d'ajouter un quatrième site (Vatovavy Fitovinany)

Les participants ont suggéré à ce que la sélection des sites tient compte de 2 critères : voir s'il y a des effets du changement climatique dans la région donnée, et considérer des régions qui ne sont pas encore touchées par d'autres projets.

Aussi, afin d'effectuer un choix raisonnable des sites d'intervention du projet, la consultante internationale a procédé à un jeu d'exercice qui consistait à trier les sites en se basant sur une matrice de sélection. Pour chaque région potentielle pour le projet, les participants devaient fournir une réponse (1.Faible - 2. Moyen 3.Elevé) aux critères ci dessous pour les 4 régions sélectionnés (Atsinanana, Menabe, Boeny, et Vatovavy Fitovinany):

Dégradation des côtes	cyclones au cours des 5 dernières années	potentialités socio économiques	degré de pauvreté	Insécurité alimentaire	TOTAL
F M E (1 2 3)	F M E (1 2 3)	(1 2 3)	(1 2 3)	F M E (1 2 3)	=

écologiques			Socio économiques			Techniques	TOTAL
Niveau de dégradation des mangroves	niveau de dégradation des récifs coralliens	niveau de dégradation des forêts côtières	Niveau de pauvreté	Proportion de population dépendant des ressources naturelles	disponibilité des ressources en eau	Nombre de projets portant sur les CC	
(1 3)	(1 3)	(1 3)	(1 3)	(1 3)	(1 3)	(1 3)	

En fin d'après midi, les participants ont été divisés en 4 groupes. Chacun des groupes a été invité à proposer des activités concrètes permettant d'atteindre les résultats attendus du projet selon le cadre logique, par composante. Aussi, d'après les participants, les activités prioritaires du projet sont :

<b><u>GROUPE 1</u></b>
<b>COMPOSANTE 1 : RENFORCEMENT DES CAPACITES INSTITUTIONNELLES</b>

<b>Résultats attendus 1</b>	<p>Etablir un état des lieux (situation actuelle) sur la vulnérabilité, les risques, les mesures d'adaptation déjà existantes ;</p> <p>Faire une analyse diagnostique de la situation actuelle ;</p> <p>Formuler les recommandations ;</p> <p>Traduire en activité les recommandations d'où l'élaboration du plan d'adaptation en zones côtières avec la participation de tous les secteurs concernés.</p>
<b>Résultats attendus 2</b>	Organiser des séances de formation des gestionnaires d'aires protégées et des ressources naturelles à accroître leur capacité à gérer les écosystèmes et aux bénéfices de l'approche éco systémique de l'adaptation au changement climatique.
<b>Résultats attendus 3</b>	<p>Organiser des séances de formation des institutions concernées à élaborer, à développer les normes et textes ainsi que les instruments législatifs par la planification des aménagements en zone côtière ;</p> <p>Organiser des ateliers inter régionaux de partage et d'échange d'expériences.</p>
<b>Résultats attendus 4</b>	Mettre en place un mécanisme de coordination efficace pour les changements climatiques.
<b><u>GROUPE 2</u></b>	
<b>COMPOSANTE 2 : REHABILITATION ET GESTION DES ZONES COTIERES POUR UNE RESILIENCE A LONG TERME</b>	
<b>Résultats attendus 1</b>	Restaurer les écosystèmes marins et côtiers endommagés adaptée au changement climatique selon les résultats de la composante 1 (reboisement dragage,...).
<b>Résultats attendus 2</b>	<p>Mettre en place des dispositifs et infrastructures de défenses contre la sédimentation ;</p> <p>Mettre en place des Aires Protégées marines et côtières ;</p> <p>Mettre en place des indicateurs de changement climatique à inclure dans la gestion des Aires Protégées marines et côtières ;</p> <p>Améliorer et suivre la qualité des déversements en amont des écosystèmes marins et côtiers ;</p> <p>Mettre en place les infrastructures de protection contre les inondations, de prévention et de réduction des pollutions marines .</p>
<b>Résultats attendus 3</b>	Développer des activités « durables » génératrices de revenus (ex : apiculture, aquaculture, écotourisme,...)
<b>Résultats attendus 4</b>	<p>Capitaliser et diffuser des pratiques des pratiques d'adaptation existantes ;</p> <p>Développer des projets pilotes et mettre à l'échelle des projets approuvés.</p>
<b><u>GROUPE 3</u></b>	
<b>COMPOSANTE 2 : REHABILITATION ET GESTION DES ZONES COTIERES POUR UNE RESILIENCE A LONG TERME (Suite)</b>	

<b>Résultats attendus 5</b>	Mettre en place un centre météorologique moderne dans chaque site ou région sélectionnée ; Renforcer la capacité technique des personnels de ce centre ; Mettre en place un système d'alerte pour la population (par exemple : sirène, drapeau,...)
<b>Résultats attendus 6</b>	Créer une ou des associations ou ONG locale qui sera chargé de la gestion des risques climatiques en zone côtière ; Renforcer la capacité de l'ONG ou Association ; Doter et équiper par des moyens matériels et financiers l'association ou ONG ; Former et éduquer les communautés locales cibles ;
<b>Résultats attendus 7</b>	Définir l'état des lieux de chaque site cible ;
<b><u>GROUPE 4</u></b>	
<b>COMPOSANTE 3 : INTEGRATION DES MESURES D'ADAPTATION DANS LES POLITIQUES NATIONALES ET STRATEGIES DE DEVELOPPEMENT</b>	
<b>Résultats attendus 1</b>	Eduquer, sensibiliser et former la population sur le changement climatique et ses impacts.
<b>Résultats attendus 2</b>	Identifier et mettre à jour les bonnes pratiques d'adaptation au changement climatique.
<b>Résultats attendus 3</b>	Elaborer un manuel pour l'intégration des mesures d'adaptation dans les politiques nationales et les stratégies de développement.
<b>Résultats attendus 4</b>	Renforcer la capacité des personnels techniques responsables de l'intégration des mesures d'adaptation dans les différents secteurs à travers des ateliers de formations , de documentation, des guides pratiques, etc.
<b>Résultats attendus 5</b>	Prendre en compte dans la planification budgétaire de l'Etat les actions relatives aux mesures d'adaptation au changement climatique.
<b>Résultats attendus 6</b>	Effectuer une analyse de base du rôle des écosystèmes et zones protégées marines dans l'adaptation au changement climatique ; Faire l'étude de vulnérabilité des zones côtières ; Proposer des mesures d'adaptation des écosystèmes côtiers et les zones protégées marines à l'adaptation au changement climatique.

Après la clôture de l'atelier à 16h00, la consultante internationale a rencontré les membres provisoires pour la prestation sur la phase préparatoire du projet pour une discussion générale du plan de travail.

### ANNEXE 1 : AGENDA

<b>Heure</b>	<b>Activités</b>
09.00	Mot de bienvenue et présentations des participants
09.30	Rappel sur le projet
10.00	Présentation de la phase préparatoire
10.30	Table ronde sur la gestion côtière
12.00	Pause
13.00	Sélection des sites
14.00	Discussion sur les activités potentielles du projet
16.00	Clôture de l'atelier
16.15 - 17.30	Réunion des membres provisoires de l'équipe du projet.

## ANNEXE 2 : PRESENTATION POWERPOINT 1

### Adaptation de la Gestion Côtière au Changement Climatique tenant compte des écosystèmes et des moyens d'existence

Projet PANA sur financement FEM - Fonds PMA

#### Contexte

- ▶ Madagascar a terminé son PANA en 2006
- ▶ Le PANA contient 15 profils de projets prioritaires, dont au moins 4 sur la zone côtière
- ▶ En collaboration avec le PNUE, le concept de projet sur les zones côtières a été soumis au FEM en 2012
- ▶ Le concept de projet (PIF) a été approuvé pour un financement à hauteur de X millions \$US.

#### Concept de projet

- ▶ Objectif: Réduire la vulnérabilité de la zone côtière au changement climatique et à la variabilité climatique dans le but d'augmenter sa contribution au développement national économique et la réduction de la pauvreté

#### Composante 1 - Renforcement des capacités institutionnelles

1. Des capacités institutionnelles pour s'attaquer aux impacts des changements climatiques en zone côtières renforcées
1. La vulnérabilité, les risques et les mesures d'adaptation sont identifiées et un plan d'adaptation en zone côtière multi-sectoriel est développé
2. Les gestionnaires d'aires protégées et des ressources naturelles sont formés à la gestion des écosystèmes et aux bénéfices de l'approche écosystémique de l'adaptation aux CC.
3. Les capacités institutionnelles de développer des normes, instruments législatifs et règlements sur la planification des aménagements en zone côtière sont renforcées
4. Un mécanisme de coordination efficace pour les changements climatiques est mis en place

#### Composante 2 - Réhabilitation et gestion des zones côtières pour une résilience à long terme

Les zones côtières sont réhabilitées, résilientes et protégées à travers un système de gestion participative efficace

1. Les écosystèmes côtiers et les zones tampons sont réhabilités et résilients
2. Les mangroves, marais, berges, plages et récifs coraliens fournissent des services écosystémiques de protection.
3. Les barrières à la résilience côtière sont levées grâce à la promotion des pratiques durables d'utilisation des ressources naturelles et à l'introduction de moyens d'existence alternatifs
4. Les technologies pour la protection et la réhabilitation des atouts productifs côtiers sont démontrées (par ex. Combinaison entre digues et mangroves)
5. L'infrastructure de suivi du climat, y compris le système d'alerte précoce côtier est opérationnel, et la capacité technique est renforcée
6. Le système de gestion avec participation effective des communautés locales formées à la gestion des risques climatiques en zone côtière est créé et opérationnel
7. Les systèmes de suivi écologique côtiers et marins sont établis, effectifs et accessibles
8. L'efficacité des interventions de réhabilitation écosystémique est mesurée

### Composante 3- Intégration des mesures d'adaptation dans les politiques nationales et stratégies de développement

#### Des politiques et stratégies nationales et sectorielles qui intègrent les mesures d'adaptation aux changements climatiques

1. Les impacts du changement climatique sur les installations urbaines côtières et sur l'utilisation des terres urbaines sont compris
2. La sensibilisation et la connaissance des bonnes pratiques d'adaptation à tous les niveaux est augmentée
3. Les outils et méthodologies pour l'intégration des mesures d'adaptation dans les politiques nationales et les stratégies de développement sont adoptées
4. La capacité des personnels techniques responsables de l'intégration des mesures d'adaptation dans les différents secteurs est renforcée
5. Les mesures d'adaptation sont intégrées dans les stratégies et lois de développement nouvelles et existantes (MECIE, Charte de l'Environnement, Code de l'Environnement) avec les mesures adéquates d'allocation budgétaires pour leur mise en œuvre
6. Une stratégie nationale pour le rôle des écosystèmes côtiers et les zones protégées marines dans l'adaptation au changement climatique est préparée

### Zones d'intervention Morondava, Mahajanga, Toamasina



### Financement

Composante	FEM	Co-financement
1.	350,000	900,000
2.	4,040,000	9,175,000
3.	460,000	1,250,000
Gestion, Suivi et Évaluation	500,000	640,000
<b>TOTAL</b>	<b>5,530,000</b>	

### Co-financement

Partenaire	Type	Montant
Gouvernement de Madagascar	Programmation de référence	3,500,000
	En nature	840,000
JICA	Programmation de référence	2,650,000
Suisse	Programmation de référence	1,000,000
WWF	Programmation de référence	1,000,000
PNUE	Programmation de référence	2,925,000
<b>TOTAL</b>		<b>10,930,000</b>

### Phase préparatoire du projet

- ▶ **Durée 8 mois (octobre 2013)**
- ▶ **Objectifs:**
  - ▶ Préciser les sites d'intervention
  - ▶ Établir les études de référence (état des lieux)
  - ▶ Finaliser la liste des activités
  - ▶ Développer les plans de mise en œuvre et les budgets
  - ▶ Confirmer les arrangements de co-financement
  - ▶ Développer le document de projet
- ▶ **Équipe de consultants (5)**
- ▶ **Consultations sur le terrain avec les parties prenantes**

## ANNEXE 3 : PRESENTATION POWERPOINT 2

**Adaptation de la Gestion  
Côtière au Changement  
Climatique tenant compte des  
écosystèmes et des moyens  
d'existence**

Survol de la phase préparatoire du projet

### Plan de travail indicatif

Activité	Échéance
Sélection des sites	30 mars 2013
1ere liste des activités	30 mars 2013
<b>Cadre logique</b>	<b>30 avril 2013</b>
1ere consultation locale	15 juin 2013
Analyse des parties prenantes	15 juin 2013
Étude sur les écosystèmes	15 juin 2013
Études sur les moyens d'existence	15 juin 2013
Analyse des besoins en infrastructure et technologie	15 juin 2013
Collecte d'information sur les activités "de référence"	30 juin 2013
<b>1ere version du document de projet</b>	<b>30 juin 2013</b>
Analyse de la gouvernance et arrangements institutionnels	1 juillet 2013
2e consultation locale	1 août 2013
<b>2e version du document de projet</b>	<b>1 septembre 2013</b>
<b>Soumission aux Agences et au FEM</b>	<b>Octobre 2013</b>

### Phase préparatoire du projet

- Durée 8 mois (octobre 2013)
- ▶ Objectifs:
  - ▶ Préciser les sites d'intervention
  - ▶ Établir les études de référence (état des lieux)
  - ▶ Finaliser la liste des activités
  - ▶ Développer les plans de mise en oeuvre et les budgets
  - ▶ Confirmer les arrangements de co-financement
  - ▶ Développer le document de projet
- ▶ Équipe de consultants (5)
- ▶ Consultations sur le terrain avec les parties prenantes

## ANNEXE 4 : PRESENTATION POWERPOINT 3

### Adaptation de la Gestion Côtière au Changement Climatique tenant compte des écosystèmes et des moyens d'existence

#### Sélection des sites d'intervention

### Méthodes de sélection

- ▶ Revue de la documentation
- ▶ Jugement d'experts
- ▶ Validation auprès des autorités locales

### Proposition de critères de sélection

- ▶ Présence d'écosystèmes endommagés par les changements climatiques ou les pressions humaines
- ▶ Proximité d'aires protégées, de parcs naturels ou de réserves
- ▶ Niveau de pauvreté des communautés utilisatrices
- ▶ Proximité d'installations urbaines et densité de population
- ▶ Autres?

### Exemple de matrice de sélection

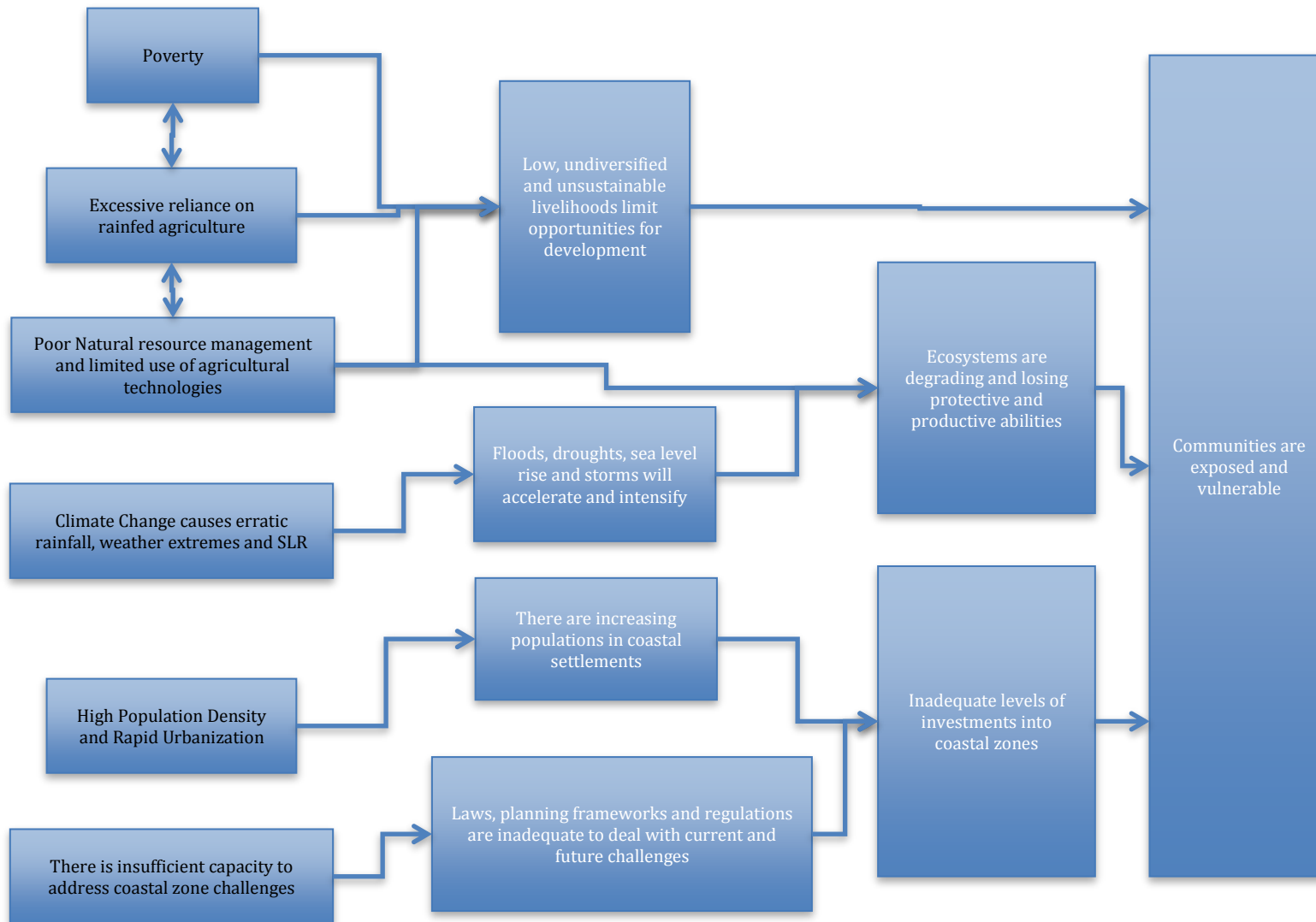
	Écosystèmes Endommagés	Sites urbains	Niveau de pauvreté	Aires protégées
Morondava				
- Sous-site X		O/N Densité		
- Sous-site Y			Élevé X pêcheurs Y agriculteurs	
Mahajanga				
- Sous-site X				Parc national
- Sous-site Y				
Toamasina				
- Sous-site X	mangroves			
- Sous-site Y				

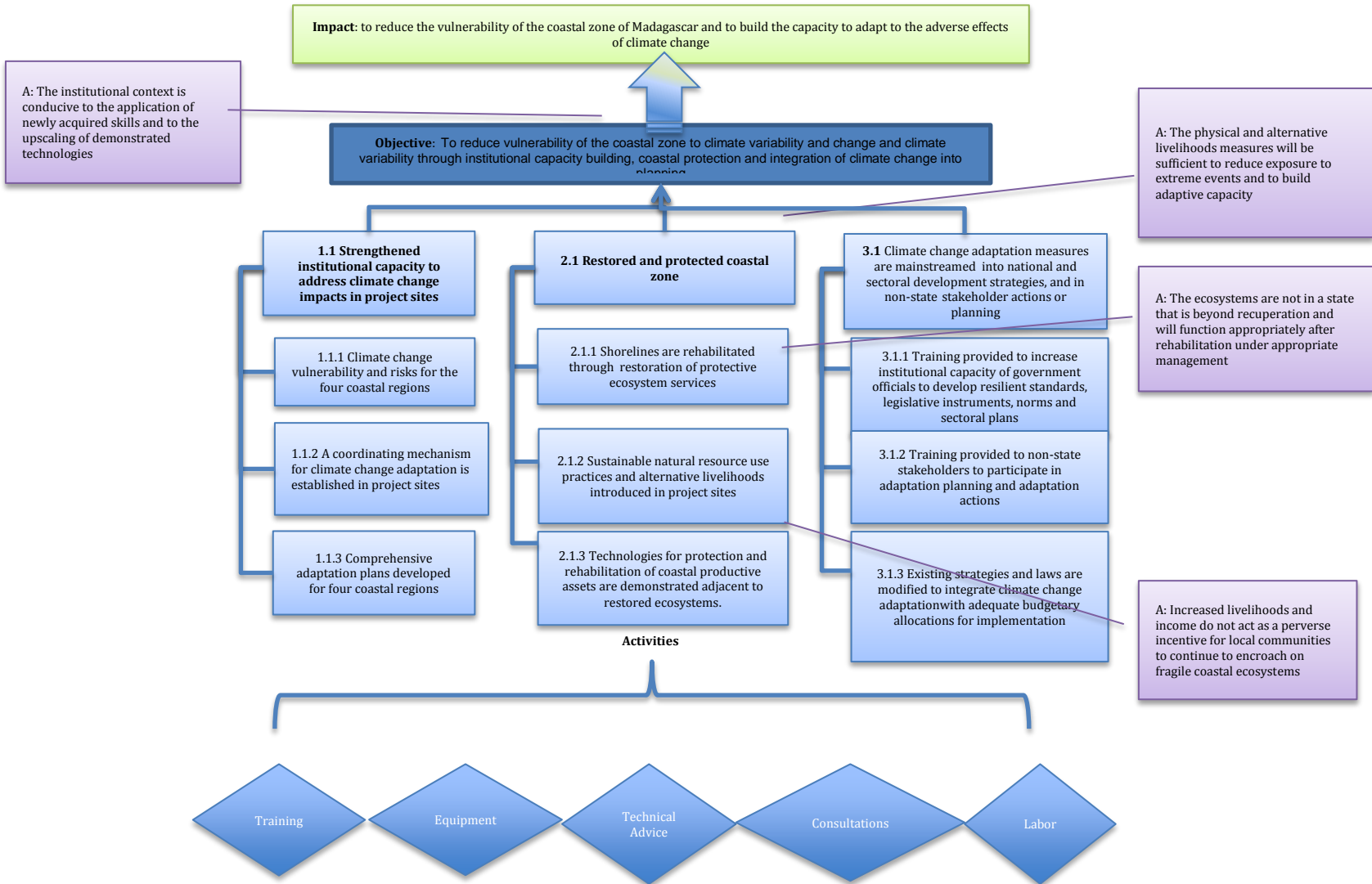
**ANNEXE 5 : LISTE DES PARTICIPANTS**

<b>N°</b>	<b>Noms et prénoms</b>	<b>Position Institution</b>
01	TSIMIHETY Chermes	PCA ONG Miaro Boeny (Majunga)
02	RASOJIVOLA Jean Emile	Chef de service développement – Région Boeny
03	RALAIVOA Agnès Bruno	Président ONG Région Atsinanana
04	RANDRIAMAHARITRA Philibert	Région Atsinanana
05	ANDRIANANDRASANA Onimandimbisoa	JICA
06	RAZAFINJATOVO Vololomboahangy Cooper	CPGH
07	RAKOTONDRAZAFY Harisoa Hasina	WWF
08	VAVITSARA Brigitte Eugénie	Chef de service – Ministère du Tourisme
09	RALISON Anatole Harimana	CRGIZC Menabe
10	RAHANTAMALALA Béatrice Hortense	Représentante de la Région MENabe
11	RAKOTOBE Henri	Consultant
12	BAROVA Harimanga	Consultante
13	RANDRIAMBOLAMANANA Hoby Nantenaina	Consultante
14	ANDRIANANTENAINA Gabriel	DDR Vatovavy Fitovinany
15	ANDRIANDRAPIANDRA RAZAFIMAHATRATRA	ONG MIND Manakara
16	RAKOTOBE RAHELIARISOA Holinantenaina	Ministère de l'eau
17	RAZAKANAIVO Mamy	Président CN GIZC
18	ANDRIAMITOSY Lalandy	VPDAT
19	RAKOTONIRIANA Lovasoa Michael	Consultant
20	RANDRIAMANARIVO Jean Romuald	Consultant
21	RABARISON Guy	Consultant
22	ANDRIAMIARINOSY Mbolatiana	CN GIZC
23	MANANKASINA Todisoa	Collaborateur DCC
24	NIRINA Jean Gabriel	Collaborateur DCC
25	LALASON Aimé Marcellin	Collaborateur DCC
26	ANDRIATSALAMA Come	Chef de service – SGBD DCC
27	LAIVAO Michel Omer	Chef de service – SACC DCC
28	RAZANAMIHARISOA Jane	Chef de service – SAECC DCC
29	RAKOTONDRAZAFY ANDRIAMAMPANDRY Riambatosoa	Assistante de Projet TCN
30	HERILALAINA Tahirinjanahary	Collaborateur DCC
31	Mialisoa Lalaina	Collaborateur DCC
32	MARA Edena	Collaborateur DCC

Arrêté à la liste de 32 participants

**APPENDIX 14 – PROBLEM TREE AND THEORY OF CHANGE**





## APPENDIX 15 – THEMATIC REPORTS (ATTACHED SEPARATELY)

## APPENDIX 16 – METHODOLOGY FOR CALCULATION OF CLIMATE CHANGE VULNERABILITY INDEX

### Conceptual framework for the vulnerability index construction

The conceptual framework for the vulnerability analysis is based on the Intergovernmental Panel on Climate Change's definition of vulnerability: "*the degree, to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity; and its adaptive capacity*"<sup>55</sup>. Understanding vulnerability requires an integrated approach that considers both the physical risks (external climate effects) and social dimensions (susceptibility/ability to cope). Thus, vulnerability is best understood as an aggregate of three components:

- **Exposure** – nature and degree to which a system is exposed to significant climate variations.
- **Sensitivity** – responsiveness of a system to the climate variations (dependant on socio-economic and environmental conditions).
- **Adaptive capacity** – ability of a community to re-organise and minimise loss to cope with the effects of climate change. For the most part, this depends on whether the community has access to natural, financial, social, human and physical capital.

### Calculation of the vulnerability index

The vulnerability index was calculated using the following equations:

- The exposure index was expressed as the sum of the scores for indicators (1– 6)

$$Exposure = (\sum_6^1 score\_indicator)$$

- The sensitivity index was expressed as the sum of the five indicator scores (7 – 11).

$$Sensitivity = (\sum_{11}^7 score\_indicator)$$

- The adaptive capacity index was expressed as the sum of the four indicator scores (12 – 15).

$$Adaptive\ Capacity = (\sum_{15}^{12} score\_indicator)$$

- The vulnerability index was expressed as the product of sensitivity and exposure minus adaptive capacity.

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<sup>55</sup> IPCC, 2007. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Parry, M.L., Canziani, O.F., Palutikof, J.P., van der Linden, P.J., Hanson, C.E. (Eds.) Cambridge University Press: Cambridge, UK, 976 pp.

Vulnerability = (Exposure x Sensitivity) – Adaptive capacity

