

# CLIMATE INVESTMENT FUNDS

PPCR/SC.8/6  
June 14, 2011

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Meeting of the PPCR Sub-Committee  
Cape Town, South Africa  
June 28 and 29, 2011

Agenda Item 7

**STRATEGIC PROGRAM FOR CLIMATE RESILIENCE  
MOZAMBIQUE**

## Proposed Decision by PPCR Sub-Committee

The PPCR Sub-Committee, having reviewed the *Strategic Program for Climate Resilience for Mozambique* (document PPCR/SC.8/6),

- a) endorses the SPCR as a basis for the further development of the projects foreseen in the strategic plan and takes note of the requested funding of USD50 million in grant funding and USD52 million in other concessional resources. The Sub-Committee reconfirms its decision on the allocation of resources, adopted at its meeting in June 2010, that a range of funding for the country should be used as a planning tool in the further development of project and program proposals to be submitted to the PPCR Sub-Committee for PPCR funding approval, recognizing that the minimum amount of the range is more likely and that the upper limit of the range will depend on availability of funding.

The range of funding agreed for a single country pilot program is USD40-50 million in grant resources, and USD40-55 million in other concessional resources. The Sub-Committee also recognizes that the quality of the proposed activities will be a significant factor in the funding to be approved by the Sub-Committee when project and program proposals are submitted for approval of PPCR funding.

- b) takes note of the estimated budget for project preparation and supervision services for the projects referenced above and approves a first tranche of funding for MDB preparation and supervision services as follows:
  - i. USD245,000 for the project, *Introducing Climate-resilience into the Design and Management of Mozambique's Unpaved Roads* (World Bank),
  - ii. USD245,000 for the project, *Coastal Cities and Climate Change* (World Bank),
  - iii. USD255,000 for the project, *Climate-resilient Water-enabled Growth: Transforming the Hydro-meteorological Services* (World Bank),
  - iv. USD255,000 for the project, *Sustainable Land & Water Resources Management* (AfDB),
  - v. USD245,000 for the project, *Enhancing Climate Resilience Agricultural Production and Food Security* (AfDB),
  - vi. USD220,000 for the project, *Program Management and Technical Assistance* (WB).
- b) requests the Government of Mozambique and the MDBs to take into account all written comments submitted by Sub-Committee members by July 15, 2011 in the further development of the projects.

**MOZAMBIQUE**

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**STRATEGIC PROGRAM FOR CLIMATE RESILIENCE**

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**The Government of Mozambique**

**June 2011**

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## Acronyms

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|        |   |
|--------|---|
| AAP    | Africa Adaptation Program   |
| AFDB   | African Development Bank  |
| AFP    | Agence Française de Développement   |
| CONDES | Conselho Nacional De Desenvolvimento Sustentável (Sustainable Development Council)  |
| DANIDA | Danish International Development Agency   |
| DFID   | Department for International Development  |
| DNA    | National Water Department   |
| GCM    | General Circulation Model   |
| GDP    | Gross Domestic Product  |
| GFFDR  | Global Facility for Disaster Reduction and Recovery   |
| GTZ    | Deutsche Gesellschaft für Technische Zusammenarbeit (now GIZ - <i>Deutsche Gesellschaft für Internationale Zusammenarbeit</i> (German Company for International Cooperation)) |
| HDI    | Human Development Index   |
| IFC    | International Financial Corporation   |
| IIAM   | Agronomic Investigation Institute of Mozambique   |
| INAM   | National Meteorological Institute   |
| INGC   | National Institute of Disaster Management   |
| IPCC   | International Panel for Climate Change  |
| MAE    | Ministério da Administração Estatal   |
| MICOA  | Ministry of Coordination of Environmental Affairs   |
| MINAG  | Ministry of Agriculture   |
| MPD    | Ministry of Planning and Development  |
| NAPA   | National Adaptation Programme of Action   |
| ODI    | Overseas Development Institute  |
| PARPA  | Action Plan for the Reduction of Absolute Poverty   |
| PPCR   | Pilot Program for Climate Resilience  |
| REDD   | Reducing Emissions from Degradation and Deforestation   |
| SEA    | Strategic Environmental Assessment  |
| SESA   | Strategic Environment and Social Assessment   |
| SLR    | Sea Level Rise  |
| SMEs   | Small and Medium Enterprises  |
| SPCR   | Strategic Program for Climate Resilience  |
| UEM    | University of Eduardo Mondlane  |
| UNDP   | United Nations Development Programme  |
| UNICEF | United Nations Children's Fund  |
| WB     | World Bank  |



## Pilot Program for Climate Resilience

### Summary of Strategic Program for Climate Resilience for Mozambique

|   |  |   |
|---|--|---|
| <b>1. Country/Region:</b>   | Mozambique, Southern Africa  |   |
| <b>2. PPCR Funding Request (in USD million):</b>                              | Loan: \$52 million   | Grant: \$50 million   |
| <b>3. National PPCR Focal Point:</b>  | Adriano Ubisse, National Director (MPD)<br>Xavier A. Chavana, PPCR Co-Coordinator (MPD)<br><br>Ana Paula Chichava, Deputy Minister (MICOA)<br>Aguilhermina Amurane, PPCR Coordinator (MICOA) |   |
| <b>4. National Implementing Agency (Coordination of Investment Strategy):</b> | Ministry of Planning and Development (MPD)<br><br>Ministry for Coordination of Environmental Affairs (MICOA)   |   |
| <b>5. Involved MDB</b>  | World Bank (WB)<br>African Development Bank (AfDB)<br>International Finance Corporation (IFC)  |   |
| <b>6. MDB PPCR Focal Point and Project/Program Task Team Leader (TTL):</b>    | Headquarters-PPCR Focal Point:<br>WB: Kanta Kumari<br><br>AfDB: Kisa Mfalila<br><br>IFC: Khetsiwe Dhlamini   | WB: Jean-Christophe Carret<br>Sr. Environmental Economist<br>jcarret@worldbank.org<br><br>AfDB: Oladapo Olagoke<br>Principal Agricultural Economist<br>o.oladapo@afdb.org<br><br>IFC: Katia Daude<br>Investment Officer<br>kdaude@ifc.org |

## 7. Description of SPCR:

### (a) Key challenges related to vulnerability to climate change/variability:

Mozambique is one of the poorest countries in the world. More than 50 per cent of Mozambique's population today remains below the absolute poverty level. Rural populations are disproportionately poor, with more than 80 percent of poor households located in rural areas. Mozambique is also extremely vulnerable to climate change and all IPCC scenarios predict that climate change will have important implications for Mozambique by increasing overall temperatures, making rainfall patterns more variable and by rising sea levels. Droughts have been the most frequent cause of disasters, but the country also experiences severe flooding, saline inundation and coastal storms. These have a significant impact on Mozambique's economy and recent analysis by the World Bank suggests economic losses will increase significantly under future climate scenarios.

### (b) Areas of Intervention – sectors and themes

The Strategic Program for Climate Resilience (SPCR) for Mozambique integrates climate change budget support (to be delivered through a DPO), technical assistance for knowledge management, capacity-building and studies, and pilot investments in the following sectors:

- **Transport:** Design and management of unpaved roads.
- **Urban:** Upgrading infrastructure in coastal cities to cope with more extreme weather events.
- **Hydrometeorology:** Developing a hydro-meteorological system to reduce climate risk.
- **Agriculture:** Diversification of seeds, cropping and water harvesting techniques.
- **Natural resources:** Community-based approaches to watershed management.
- **Private sector:** Credit lines to encourage private investment in micro-irrigation and sustainable forest management.

### (c) Expected Outcomes from the Implementation of the SPCR

- Selected infrastructure, agriculture and natural resource management systems in the key productive regions of the Limpopo and Zambezi valleys become more climate-resilient.
- Selected vulnerable coastal cities become more resilient to storm-induced flooding and rainfall damage.
- The private sector invests more in climate resilient adaptation in selected agricultural and forestry focal areas.
- Stronger capacity to integrate climate resilience into national, sector and local plans and policies.

**8. Expected Key results from the Implementation of the Investment Strategy (consistent with PPCR Results Framework):**

| Result   | Success Indicator(s)   |
|--|--|
| (a) Effective use of limited public financing for climate resilient infrastructure.  | <p>Provincial and national <b>strategies adopt cost-effective technologies</b> for building-in climate resilience and responding quickly to weather-related damage in coastal cities and the road sector.</p> <p><b>Adaptation plans</b> adopted by municipal authorities for two coastal cities (Beira and Nacala).</p> <p>Drainage and coastal protection systems in coastal city of Beira upgraded to cope with longer return period storms.</p> <p>Approaches to the <b>sustainable financing of climate-resilient infrastructure</b> are identified and piloted at the municipal level.</p>       |
| (b) Lower climate-related water risks to local communities, agricultural production and infrastructure as a result of improved hydro-meteorological information                | <p>Fully operational hydro-meteorological system in place for Zambezi and Limpopo.</p> <p>Increase of accuracy and lead time of weather forecast in the two pilot basins</p> <p>Improved <b>hydro-meteorological information is mainstreamed</b> in the planning of major economic sectors.</p>  |
| (c) Improved production and livelihoods resulting from the introduction of climate-resilient approaches and private sector investment in agriculture and watershed management. | <p>Increased agricultural production and added value from forest resources to increase climate resilience.</p> <p>Increases in farm sizes with <b>access to irrigation</b> (from 0.4ha to 1.5ha).</p> <p>Increased use of drought-tolerant, certified seeds.</p> <p>Reduced areas of land affected by saline intrusion in Gaza province.</p> <p>Additional <b>private sector investment leveraged</b> to finance climate-resilient agricultural production and forest management.</p> <p>National and provincial plans and strategies include cost-effective approaches piloted with PPCR support.</p> |

|   |   |
|---|---|
| <p>(d) Plans and strategies for integrating climate resilience into key sector plans and provincial development strategies.</p> | <p>Provincial review processes completed by MPD and MICOA for provinces in Limpopo and Zambezi river valleys</p> <p>Provincial and district adaptation plans prepared.</p> <p>Provincial sector and spatial planning guidelines issued by MPD and MICOA.</p> <p>In service training and capacity-building courses developed and delivered on a pilot basis.</p> |
|---|---|

| 9. Project and Program Concepts under the SPCR:   |      |   |                       |                                    |                                |                                 |                      |
|---|------|---|-----------------------|------------------------------------|--------------------------------|---------------------------------|----------------------|
| Project/Program Concept Title   | MDB  | Requested PPCR Amount (million \$) <sup>1</sup> | Grant or Loan         | Expected co-financing (million \$) | Preparation grant request (\$) | Total PPCR request (\$ million) | MDB Fee (\$ million) |
| Introducing climate-resilience into the design and management of Mozambique's unpaved roads   | WB   | 20  | 50% grant<br>50% loan | 15                                 |                                | 20                              |                      |
| Coastal cities and climate change   | WB   | 20  | 50% grant<br>50% Loan | 40                                 |                                | 20                              |                      |
| Climate-resilient water-enabled growth: transforming the hydro-meteorological services  | WB   | 10  | 100% grant            | 5                                  |                                | 10                              |                      |
| Sustainable Land & Water Resources Management   | AfDB | 20  | 50% grant<br>50% Loan | 20                                 |                                | 20                              |                      |
| Enhancing Climate Resilience Agricultural Production and Food Security  | AfDB | 20  | 50% grant<br>50% Loan | 25                                 |                                | 20                              |                      |
| Developing climate resilience in the agricultural and peri-urban water sectors through provision of credit lines from Mozambican banks  | IFC  | 5   | 100% Loan             | 5                                  |                                | 5                               |                      |
| Developing community climate resilience through private sector engagement in forest management, sustainable timber harvesting and/or tourism. Options include forest areas in Niassa, Gorongosa and central Mozambique. | IFC  | 5   | 100% loan             | 19                                 |                                | 5                               |                      |
| Program management and technical assistance   | WB   | 2   | Grant                 | 1.5 <sup>2</sup> (bilateral)       |                                | 2                               |                      |
| Climate change policy lending (DPO)   |      | -   | Loan                  | 100 (IDA)                          |                                |                                 |                      |
| <b>TOTAL</b>  |      | <b>102</b>                                      |                       | <b>230.5</b>                       |                                | <b>102</b>                      |                      |

<sup>1</sup> Includes preparation grant and project/program amount.

<sup>2</sup> DFID

## 10. Timeframe (tentative) – Approval<sup>3</sup> Milestones

### **Project 1: Introducing climate-resilience into the design and management of Mozambique's unpaved roads**

Financial year 2013 (FY 013)

### **Project 2: Coastal cities and climate change**

Financial year 2012 (FY012)

### **Project 3: Climate-resilient water-enabled growth: transforming the hydro-meteorological services**

Financial year 2012 (FY012)

### **Project 4: Sustainable Land & Water Resources Management**

Financial year 2012 (FY012)

### **Project 5: Enhancing Climate Resilience Agricultural Production and Food Security**

Financial year 2012 (FY012)

### **Project 6: Developing climate resilience in the agricultural and peri-urban water sectors through provision of credit lines from Mozambican banks**

Indicative: Financial year 2012 (FY012)

### **Project 7: Developing community climate resilience through private sector engagement in forest management, sustainable timber harvesting and/or tourism. Options include forest areas in Niassa, Gorongosa, and central Mozambique.**

Indicative: Financial year 2012 (FY012)

### **Technical Assistance**

Phase 1, ongoing. Phase 2 Financial year 2011 (FY011)

### **Climate Change Policy Lending - Development Policy Operation**

Financial Year 2013 and 2015 (FY013 and FY 015)

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<sup>3</sup> Expected signature of loan/grant agreement between government and MDB.

#### **11. Key National Stakeholder Groups involved in SPCR design<sup>4</sup>:**

MICOA and MPD provide the focal points for SPCR design within GoM. MICOA is the focal point for UNFCC and MPD has responsibility for planning and development policy at national level. Both Ministries are 'cross-cutting' and were therefore able to work across different government line ministries during the design and review process. In their role as focal points, MPD and MICOA coordinated internal government review and consultation processes on an earlier draft of this document with all key sector line ministries and agencies. MICOA and MPD also coordinated and chaired consultations with civil society groups on the draft SPCR and ensured SPCR design was responsive to feedback wherever appropriate. Further consultations will take place during detailed design of investment and technical assistance components during Phase 2 of SPCR support including detailed consultations in the geographical focal areas selected for SPCR support.

#### **12. Other Partners involved in SPCR:**

There have been a range of consultations with Mozambique's international development partners during the preparation of this document and early implementation of Phase 1 activities. These are expected to continue during the detailed design process. International partners that are likely to play a particularly key role in future consultation processes include various UN agencies, including the Africa Adaptation Program implemented by the United Nations Development Program (UNDP), the United Nations Children Fund (UNICEF) and the UK Department for International Development (DFID).

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<sup>4</sup> Other local, national and international partners expected to be involved in design and implementation of the strategy.

## PART 1 – INTRODUCTION AND BACKGROUND

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### Section 1: Country Context and Regional Perspective

1. **Mozambique is considered to be a successful example of post-conflict economic recovery in Sub-Saharan Africa.** The country's 16-year civil war, which ended definitively in 1992, cost over a million lives, stunted economic growth, and destroyed much of its infrastructure. Starting from this very low base, Mozambique has seen average annual economic growth rates of 5 per cent since 1995.<sup>5</sup> The government of Mozambique initiated pro-growth economic policies such as reducing inflation, decreasing the costs of doing business, introducing a value-added tax, removing price controls and import restrictions, and privatizing state-owned-entities, among others. Due to its tight monetary policy, inflation was reduced to single-digit levels (from 70 percent in the mid-1990s). This growth was bolstered by a significant influx of foreign investment into the country and high levels of donor support—equivalent to 15 per cent of GDP, compared with the African average of 4 per cent. A decrease in rural poverty levels has accompanied economic growth in Mozambique with poverty declining from 69 per cent in 1997 to 54 per cent in 2003. Mozambique's Human Development Index (HDI), a measure of development and poverty, also improved over the years since the end of the civil war, from 0.2 to 0.3. Since 2003, the rate of decline in the poverty rate seems to have slowed.

2. **However, poverty remains a prominent challenge.** More than 50 per cent of Mozambique's population today remains below the absolute poverty level.<sup>6</sup> Rural populations are disproportionately poor, with more than 80 per cent of poor households located in rural areas and living from subsistence agriculture. The government's Third Poverty Assessment, published in October 2010 also found that nationally, the poverty rate remained unchanged since the 2003 assessment at around 55%. National Agricultural Survey data shows that Median Rural Income levels remained static between 2002 and 2008 at less than \$1 per day for an entire family. In central Mozambique, poverty rates actually increased by as much as 7% in urban areas and 16% in rural areas, partly as a result of climatic impacts on crops. The extreme poverty of Mozambique, with HDI levels well below the Sub-Saharan African level (0.5) is still striking – Mozambique ranks 165<sup>th</sup> out of the 169 countries included in the HDI ranking<sup>7</sup>. Life expectancy remains low at 47.8 years—166<sup>th</sup> out of 172 ranked countries—and Mozambique places 169<sup>th</sup> for per capita GDP (with purchasing power parity) US\$802/year.<sup>8</sup>

3. **Numerous factors contribute to high poverty rates** amongst which are lack of infrastructure (especially road access for goods and services), low agricultural productivity, lack of basic services such as health care, and low education rates - only 57 per cent of rural Mozambicans have access to primary education at all. Agriculture is a major contributor to the Mozambique economy and the major source of employment with 81 per cent of the population employed in this sector in 2007. Rural households are also exceptionally vulnerable to natural disasters, and around one third of Mozambique population is still food insecure.

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<sup>5</sup> In fact, the economy registered an average annual growth rate of 8 % between 1996 and 2007.

<sup>6</sup> IFAD, *Rural Poverty Portal*. Available at <http://www.ruralpovertyportal.org/web/guest/country/home/tags/mozambique>

<sup>7</sup> *UN Human Development Index 2010*. <http://hdr.undp.org/en/statistics/>

<sup>8</sup> *Supra*



## Section 2: Development Context and Climate Risks

### *Climate Variability*

4. **Mozambique's current climate variability** is defined by its seasonal patterns of precipitation and temperature and the frequency with which abnormal, or "extreme" weather events occur. Months of high precipitation occur between December and March for all of Mozambique in all provinces. Northern Mozambique (Niassa, Cabo Delgado, Nampula) is historically characterized by 800 to 1200 mm of annual rainfall with little annual variability. Central Mozambique exhibits substantial spatial variability with the Sofala and Zambezia provinces recording up to 1500 mm of rainfall while Tete and Manica provinces just inland of Zambezia experience around 600 mm of average annual rainfall. Southern Mozambique (Inhambane, Gaza, Maputo) has about 800 mm of annual rainfall.

5. **Annual rainfall** varies both geographically and seasonally. In southern Mozambique, rainfall ranges from 400 mm to 1200 mm, depending on location. Precipitation variability in the central and south portions of Mozambique appears to have increased between the 1990's and present time. Absolute rainfall deviations appear to have higher magnitude during these years especially in the southern and coastal regions of Mozambique also suggesting that variability may be increasing with time. There has also been an observed increase in annual rainfall in the northern portion of the country during the last two decades.

6. **Temperatures** also vary both seasonally and geographically. The period between October and April is characterized by hot temperatures and coincides with the rainy season. The period from May through September has much cooler temperatures. Minimum average temperatures during the winter months range from 14°C to 22°C with northern Mozambique recording the lowest temperatures. Maximum temperatures can range between 24°C and 32°C during the summer months with the central coast recording the highest temperatures.

7. **Inter-annual variability of temperature varies between regions.** The northern regions have experienced a relative rise in maximum temperatures since 1990 such that they are consistently over 30°C with little deviation. Inter-annual temperature variability in central Mozambique is historically low with maximum temperatures around 31°C. Monitoring data indicates that there has been a sharp increase after 1990 although this may reflect an increase of meteorological monitoring stations in the area that coincides with same period. A slight increase in the maximum temperature of southern Mozambique has been observed since the 1960's with the average remaining around 31°C.

8. **Extreme weather events** can take the form of drought, flooding and tropical cyclones and Mozambique ranks third amongst the African countries most exposed to risks from multiple weather-related hazards<sup>9</sup>. During the past 50 years, the country has experienced 68 natural disasters, and these have killed more than 100,000 people and affected up to 28 million. As much as 25 per cent of the population is at risk from natural hazards. The country's economic performance is already highly affected by frequent drought and flood and rainfall variability. An analysis over the period 1981-2004 suggests that GDP growth is cut by an average 5.5 per cent when a major water shock occurs, and many of these are the

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<sup>9</sup> 2009 Global Assessment Report on Disaster Risk Reduction, UNISDR, 2009.

direct result of extreme weather events<sup>10</sup>. Assuming a major disaster occurrence every five years, there is an average GDP growth loss of 1 per cent per year due to the impacts of water shocks.

9. **Drought is the most frequent disaster.** Droughts occur primarily in the Southern and Central regions, with a frequency of 7 in 10 and 4 in 10 years, respectively. 35 per cent of the population is now thought to be chronically food insecure. Disaster costs to the national economy have been estimated at US\$1.74 billion during 1980-2003, but this largely underestimates socio-economic losses and impacts on the poor. Economic impacts of drought seem to be most significant in Zambezi Province where production losses could range between \$12 and \$170 million for maize alone depending on the severity of the drought. In areas that are classified as semi-arid and arid (Gaza, Inhambane, and Maputo), potential maize production losses range between \$0.5 and \$11 million.

10. **Floods in Mozambique** are caused by a number of geographical factors. Floods can prevail for several months, occurring most frequently in central and southern regions, along river basins, in low-lying regions, and in areas with poor drainage systems. They are linked not only to heavy rainfall, but also to water drainage from rivers in upstream neighbouring countries: waters from nine major river systems from vast areas of South Eastern African region find their way to the Indian Ocean through Mozambique. Fifty per cent of the water in Mozambique's rivers originates from outside the country. In 2000, Mozambique experienced its worst floods in 50 years killing about 800 people and displacing 540,000. It is estimated that about 200,000 people are affected by floods with a return period of once every two years, 1 million by floods with a return period of fifty-year flood, and 1.5 million by floods with a return period of one hundred years Zambezi, Gaza, and Tete provinces are the most affected<sup>11</sup>.

11. **Seawater inundation:** More than 60 per cent of Mozambique's population of 21 million lives in coastal areas, and is therefore highly vulnerable to seawater inundation along its 2,700 km coastline. Seawater inundation includes saline intrusion of coastal aquifers and estuaries, beach erosion and extreme rises in sea level due to tropical storms and cyclones. Saline intrusion of the coastal aquifers and estuaries holds serious implications regarding coastal agriculture and fishery production. The issue of beach erosion is very serious, threatening coastal infrastructure such as roads and housing. In some portions of Beira, 30 to 40 m of beach has been eroded in the past 15 to 20 years destroying natural mangroves and encroaching on homes and roads. Storm surge poses a huge threat to coastal infrastructure as it can temporarily raise sea level as much as 5 m. While many of the major coastal cities of Mozambique have infrastructure in place to stem the effects of such an extreme event, many are in need of serious maintenance. Furthermore, Mozambique is subject to 3 or 4 cyclones every year, and in addition to the extreme wind and rainfall caused by these cyclones, they can exacerbate seawater inundation threats, especially that of storm surge.

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<sup>10</sup> Mozambique Country Water Resources Assistance Strategy : Making Water Work for Sustainable Growth and Poverty Reduction. August 2007. Africa Region. World Bank

<sup>11</sup> GFDRR (2009). Economic vulnerability and disaster risk assessment in Malawi and Mozambique: Measuring Economic Risks of Floods and Droughts. Global Facility for Disaster Risk Reduction and Recovery, World Bank, RMSI, IFPRI

### Climate change

12. **Increasing climate and weather variability seems likely**, but there is much uncertainty. General circulation models (GCMs) predict a wide range of potential climate futures for Mozambique with rainfall suspected to be extremely variable in the future. The 22 GCMs approved by the International Panel for Climate Change (IPCC) predict a range of scenarios, ranging from a decrease of 31 per cent of the average rainfall over to a 16 per cent increase in rainfall by 2050 compared to historical averages (Figure 1). Changes in management of the upstream portions of the international basins may further increase the variability of surface water flows and could seriously reduce overall cross-border water volumes. The models suggest that *inter*-annual variability is predicted to increase dramatically as well - suggesting that extreme weather events such as floods and droughts may become more frequent.

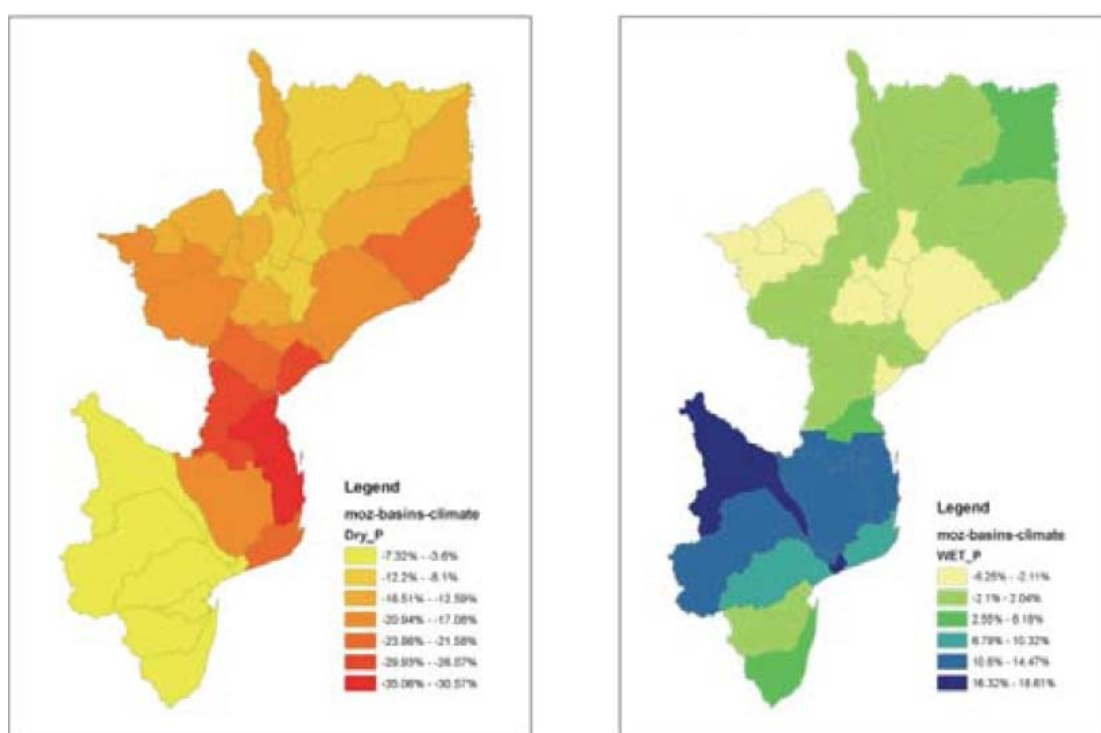
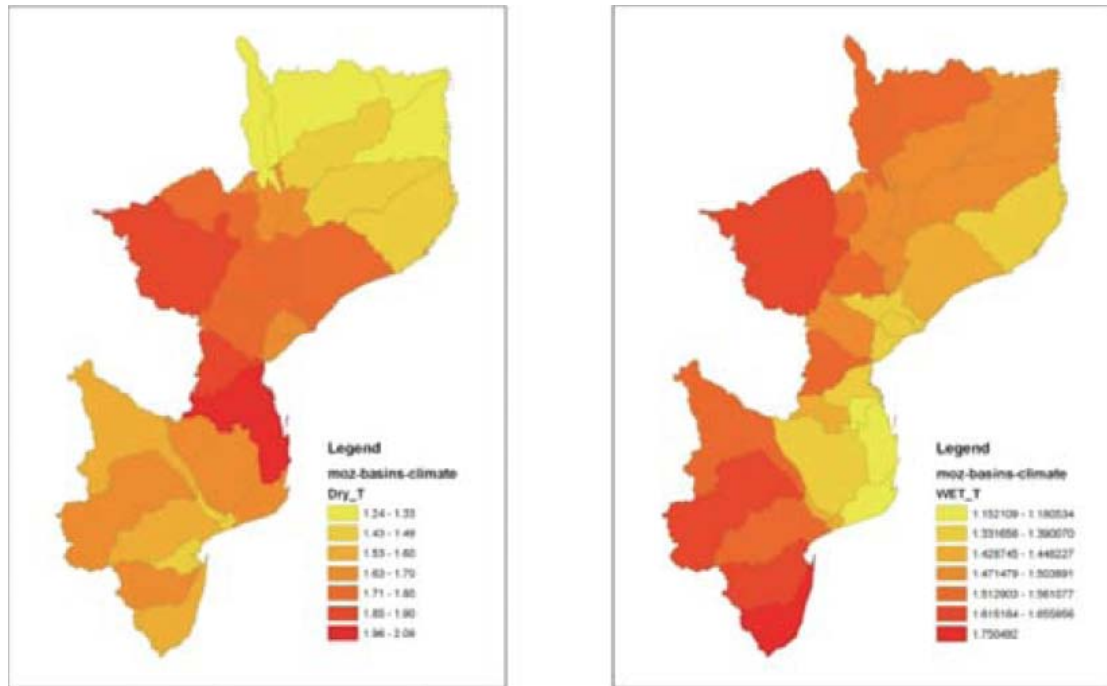


Figure 1: "Dry" and "Wet" Scenarios for Precipitation in 2050<sup>12</sup>

13. **Temperature changes:** Equally worth noting is the increasing trend in minimum temperatures across the whole of Mozambique. Seasonal variability is narrowing as the average minimum temperature is increasing to around 21°C. This is leading to a decrease in cold days with the average number of cold days and nights per year having decreased significantly since 1960. The future temperature of Mozambique is predicted to increase between 1°C and 2°C by 2050 and appears to be relatively consistent between all of the IPCC approved GCMs (Figure 2). This coupled with the narrowing of the seasonal and inter-annual variability will greatly increase the potential evaporation year round.

<sup>12</sup> World Bank (2010). Economics of Adaptation to Climate Change: Mozambique

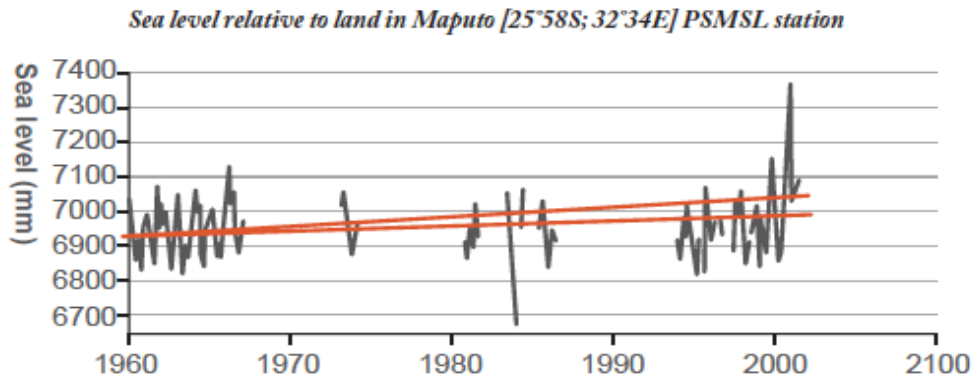
14. **Precipitation is likely to be become increasingly variable and uncertain**, although different models predict very different types of changes. Strong regional variations between north and south will remain. Models predict widely differing future scenarios for rainfall patterns in northern, central and southern regions. Most seem to agree that central Mozambique will experience a decline in rainfall between December and February, shorter rainy seasons and longer droughts. Increased evaporative effects associated with high temperatures may have greater implications on productive systems than changes in mean rainfall levels, although much uncertainty remains.



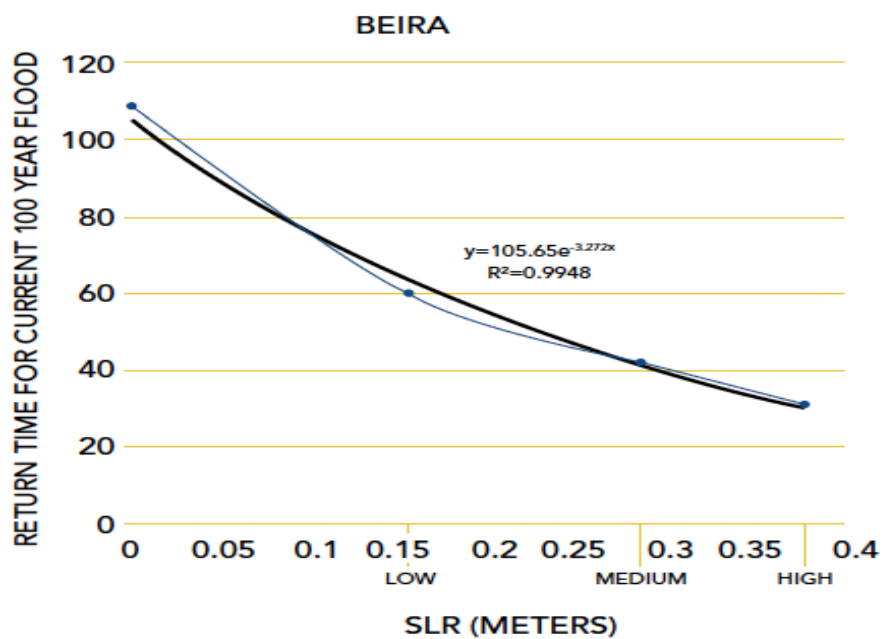
**Figure 2: “Dry” and “Wet” Scenarios for Temperature in 2050.**

15. **Sea level rises (SLR) are predicted under various IPCC scenarios** – and analysis of Maputo’s (incomplete) sea level record indicates a rise of 2.17mm/year - plus or minus 0.76mm/year (Figure 3). This is consistent with recent global SLR trends documented by the International Panel on Climate Change (IPCC)<sup>13</sup>. Any SLR is likely to have negative implications for low-lying areas where 60 per cent of Mozambique’s population lives

<sup>13</sup> IPCC (2007). Climate change 2007: impacts, adaptation and vulnerability: contribution of working group II to the fourth assessment report of the IPCC. Cambridge, Cambridge University Press.



**Figure 3: Annual mean sea level relative to land, recorded at the Maputo recording station 1960-2010<sup>14</sup>**



**Figure 4: Estimate change in effective return time for the 100-year storm surge as a result of SLR for Beira and Maputo<sup>15</sup>.**

**Overview of Potential Impacts**

16. **Macro-economic impacts:** The overall impact of climatic change on GDP could be substantial. The World Bank modelled the impact of four different IPCC climate change scenarios on economic growth and found that growth effects accumulate into significant declines in national welfare by 2050. GDP falls between 4 per cent and 14 per cent relative to baseline growth in the 2040-50 decade if adaptation strategies are not implemented.

<sup>14</sup> INGC (2009) *Synthesis Report*. INGC Climate Change Report: Study on the impact of climate change on disaster risk in Mozambique. [van Logchem B and Brito R (ed.)]. INGC, Mozambique.

<sup>15</sup> World Bank (2010). *Economics of Adaptation to Climate Change: Mozambique*

<sup>16</sup> World Bank (2011). *Economics of Adaptation to Climate Change: Mozambique*.

17. **Vulnerable sectors:** The Institute of Disaster Management (INGC) synthesis report<sup>17</sup>, which provides a comprehensive analysis of climate change trends and risk, warns that “*the exposure of Mozambique to natural disaster risk will increase significantly over the coming 20 years and beyond, as a result of climate change*”. Subsequent analysis undertaken by the World Bank study on ‘*The Economics of Adaptation to Climate Change*’<sup>18</sup> show that **rain-fed agriculture, coastal towns** and **transport infrastructure** are sectors that are particularly vulnerable to droughts, floods and cyclones. However, it is important to remember that the impacts of climate change on several sectors have not yet been assessed adequately – including the health sector and on natural resources – such as fisheries and forests. Experience in other regions indicates that investments in improved management of natural resources may well offer very cost-effective adaptation opportunities. Briefly, impacts on vulnerable sectors are expected to be the following:

### Impacts on Agriculture

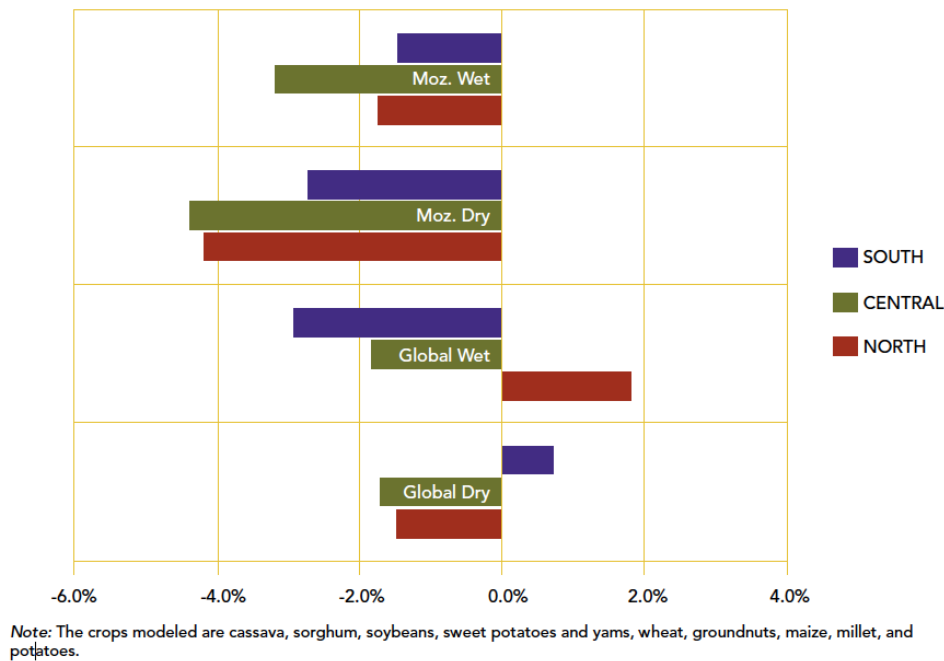
18. Detailed climate modelling presented by World Bank (and corroborated by INGC, see above) suggests that increased evaporation, associated with increasing temperatures, could have an important impact, particularly by lowering soil moisture before the onset of the rains. In all scenarios, the net average crop yield for the entire country is lower relative to baseline yield without climate change. Figure 5 shows effects on yields for all major crops using four different IPCC scenarios. The impact of climate change over the next forty years would lead to a 2-4% decrease in yields of the major crops, with yield decreases especially in the Central region. The increasing variability and unpredictability of rainfall may have an even more profound effect than changes in average annual temperature and rainfall levels. An analysis prepared by GFDRR<sup>19</sup> pointed-out that the expectation of variability and the unpredictability of rainfall and runoff also constrain opportunities for growth by encouraging risk averse behaviour and by discouraging investments in land improvements, advanced technologies, and agricultural inputs. This slows the diversification of economic activities and therefore reduces overall resilience to climate change.

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<sup>17</sup> INGC (2009). *Synthesis report. INGC Climate Change Report: Study on the impact of climate change on disaster risk in Mozambique*. [van Logchem B and Brito R (ed.)]. INGC, Mozambique.

<sup>18</sup> The analysis define a “baseline” of a growth path “without climate change” from 2011 to 2050 reflecting government plans and global trends in sector and economic growth and compare it with a growth paths “with climate change” incorporating climate shocks on priority sectors (agriculture, energy, roads, coastal zones) under alternative climate projections. Since scientists are more certain of likely patterns of temperature increase than of changes in precipitation, the work describes for a “wet” and a “dry” scenario.

<sup>19</sup> GFDRR (2009). *Economic vulnerability and disaster risk assessment in Malawi and Mozambique: Measuring Economic Risks of Floods and Droughts*. Global Facility for Disaster Risk Reduction and Recovery, World Bank, RMSI, IFPRI



**Figure 5: Climate change effects on yield for all major crops<sup>20</sup>**

### Impacts on Coastal Resources

19. Rising sea levels will increase coastal erosion - causing land loss and displacement of human populations, the loss of coastal wetlands – with implications for fisheries and coastal protection, and saline intrusion into freshwater systems and aquifers in low lying areas. Sea level rise will also exacerbate the scale and impact of storm surges associated with tropical storms and cyclones. This was assessed using modelling studies supported by World Bank. For the central coast city of Beira, the 100 year return period storm surge can be expected to occur every 60 years by 2050, even under the low SLR scenario used by the study, every 40 years under the medium-SLR scenario and every 33 years under the high SLR scenario. For the capital city of Maputo, the changes are even more dramatic, with a reduction to a 1-in-20 year event along the medium scenario (Figure 4). Modelling has shown that modest levels of sea level rise (30 centimetres by 2050) will lead to salt water intrusion in lower river basins and will require measures to protect (or move) infrastructure in low-lying urban areas. Impacts will be particularly severe in the central region. Even relatively small levels of sea level rise may dramatically increase the probability of severe storm surge events. Increasing sea levels might also lead to forced migration, either because of frequent saline inundation of urban areas and farmland, or due to land loss from increased erosion. Figure 6 shows project total annual land losses through erosion due to sea level rise (without adaptation measures), based on analysis undertaken by World Bank published in 2011. The coastal city of Beira, more exposed to cyclone tracks than Maputo, is particularly vulnerable.

<sup>20</sup> World Bank (2010). Economics of Adaptation to Climate Change: Mozambique





**Mozambique's cities, coastal wetlands and biodiversity are at risk from rising sea levels.**

### Impacts on Roads

20. Mozambique's road network is already vulnerable to weather-related damage, irrespective of the future that climate change might bring. Improving the country's road system will bring benefits to the entire economy and will also help ensure access of rural communities to health and education services and markets. Based on analysis of previous disasters, UNICEF has pointed-out that disaster-related weather damage to Mozambique's roads has important impacts on health by reducing access to medical services and food. The average annual maintenance cost of the network of Mozambique roads is about \$250 million per year representing about 12 per cent of total government spending (recurrent plus investment). Under all scenarios, the maintenance costs of paved and unpaved<sup>21</sup> roads are increasing due to temperature and precipitation increase.

### Impacts on water resources and hydropower

21. Mozambique is a downstream riparian state on all nine of its major rivers, except the Rovuma, on which it is a parallel riparian. The high dependence of Mozambique on shared water resources is an important factor in the national water vulnerability. The national water resources assistance strategy<sup>22</sup> points-out that '*An unreliable water supply is a significant disincentive for investments in industry and services, slowing the diversification of economic activities*' and *this can lower prospects for economic growth*. Further work is needed to elaborate the potential impact of climate change on water resources. Upstream rainfall reductions in Zimbabwe and Zambia could translate into significant reductions in river flows in Mozambique: notably for the Zambezi and Save, which originate in the interior of the continent. Reductions in Zambezi river flows of about 15% are predicted by six out of

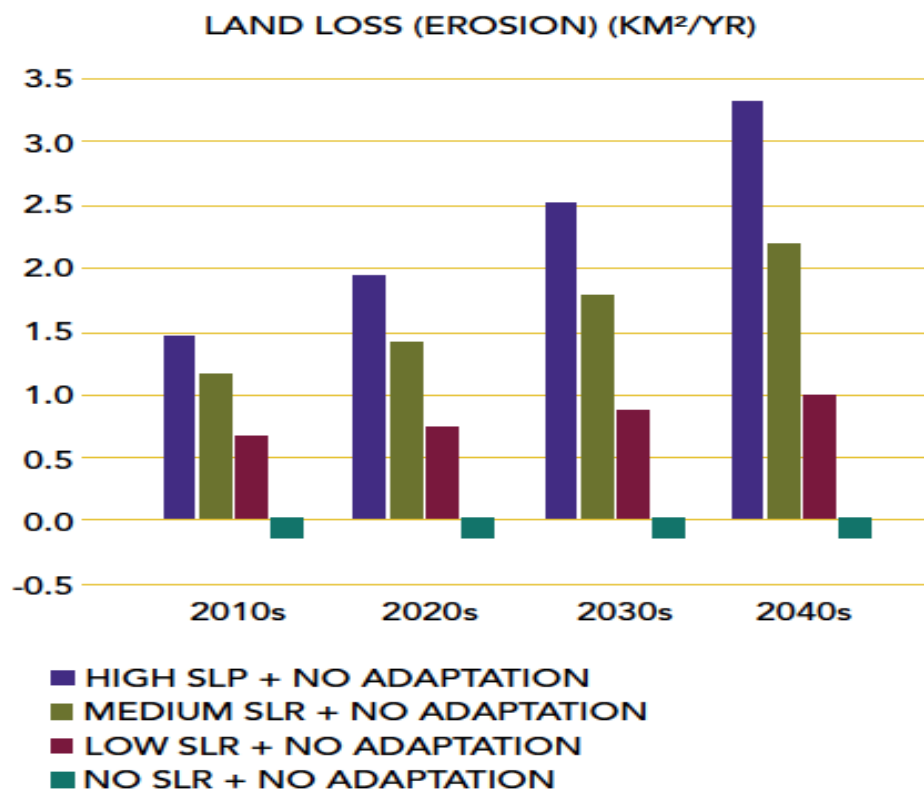
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<sup>21</sup> Unpaved road maintenance is primarily focused on the need to reseal the road every five years to preserve a usable driving surface and reduce the impact of erosion from precipitation

<sup>22</sup> Mozambique Country Water Resources Assistance Strategy : Making Water Work for Sustainable Growth and Poverty Reduction. August 2007. Africa Region. World Bank



seven models cited by INGC (2009). Actual flow reductions in the Zambezi could be much larger given the increasing risk of droughts and the growing population within its drainage area. In relation to hydropower generation, the World Bank has found that under all scenarios - except the most pessimistic, the impact of climate change on electricity supplies would be only modestly negative (1.4% less electricity generated than “without” climate change). This is because the plans for new dams have largely already taken into account changing patterns of temperature and precipitation. The most significant impact would be from increased evapotranspiration (and hence less water available for electricity) from the reservoirs. Dam operators will need to pay particular attention to the timing of water releases to ensure sufficient downstream and environmental flows at times of low water and to avoid interference with port activities.



**Figure 6: Total annual land loss (erosion) due to sea level rise from 2010 to 2050 for high, medium, low and no SLR scenarios – with no adaptation<sup>23</sup>.**

**Impacts on forest resources and land use**

22. The impact of climate change on Mozambique’s renewable natural assets – including its forest resources, has not yet been assessed. Mozambique has around 55 million hectares of forests and woodlands and rural populations often have a high dependency of forest resources for livelihood needs – including food, firewood, charcoal production and grazing. Fuel wood is by far the major source of energy in Mozambique and forest resources also contribute environment services of direct economic and livelihood value – for example, protecting watersheds, preventing soil erosion and supporting biodiversity. These services bring direct economic benefits to local communities and the national economy as a whole. In the medium to long term, their global public goods values might deliver significant revenue flows through harnessing emerging global markets for forest carbon. The main drivers of forest degradation are poverty-related – although illegal logging is increasingly an

<sup>23</sup> World Bank (2010). Economics of Adaptation to Climate Change: Mozambique

issue. For most rural communities, forest degradation is likely to increase vulnerability and decreases resilience to changing climatic conditions. Conversely, increased variability in rainfall and more prolonged dry seasons may increase the frequency of forest fires and pest outbreaks – thus contributing to the further forest degradation.



**Lower rainfall and coastal erosion will make forest-dependent livelihoods more vulnerable to climate change**

### **Impacts on health**

23. There has been no systematic assessment of potential impacts on human health in Mozambique and future work is needed on this issue. Climate-related health impacts are likely to be manifested through nutritional effects (by impacting on agriculture and access to food during extreme weather events), through disruptions in access to health care and through vector-borne diseases, including malaria. The INGC synthesis report points-out that Mozambique is amongst the 10 nations most affected by malaria, causing between 44,000 and 67,000 deaths annually in all age groups. Warmer temperatures may prolong the seasonality of transmission of vector-borne diseases, especially malaria. Malaria epidemics seem to spike following extreme floods because receding floodwaters leave conditions that allow mosquitoes to breed. Conversely, droughts are often associated with water-borne diseases, including cholera, due to declines in access to clean water for drinking and washing.

## Climate-related health impacts on children in Mozambique <sup>24</sup>

A 2006 report commissioned by the WHO found that younger children are particularly vulnerable to environmental risks. Whilst these are not always climate-related (for example, indoor pollution caused by burning biomass fuels), the findings of this study have important implications for climate change planning. The study found that the number of healthy life-years per capita lost to environmental factors was about five times higher in children under five than in the total population. Malaria, diarrhea and respiratory infections, the leading causes of child mortality in Mozambique, are also some of the diseases most strongly linked to modifiable environmental factors. Climate resilience in other sectors also has an important bearing on health outcomes. For example, a study undertaken by UNICEF in Mozambique has found that natural disasters affect children's health by disrupting their access to health facilities through damage to health infrastructure and roads, which can make delivery of medical supplies difficult or impossible. Families who have been displaced from their homes due to emergencies are often unable to access health care or continue ongoing treatment.

Impacts on nutrition are also evident, for example during and after the severe drought from 2001-2002. The impact of this drought on agricultural yields caused decreased food security and this led to resource-poor households engaging in coping mechanisms that were not in the best interest of child nutrition – the effects of which can be severe and lifelong. The main strategies used by rural, food-insecure households were to eat less-preferred foods, reduce the number of meals and eat all or part of seed stock for the next growing season. While adults may adapt to such changes in their diet, the effects on children are more severe because of their different nutritional needs.

The UNICEF study also highlighted other weather-related impacts on health. For example, in northern Mozambique, higher levels of cyanide become concentrated in the cassava root during times of drought and this can cause spastic paraparesis, also known as mantakassa, especially among children and women who may already be undernourished.

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<sup>24</sup> Child Poverty and Disparities Study, UNICEF Mozambique.

## Section 3: Overview of Climate Change Related Activities and Policies of the Government

### *Stocktaking of climate-related activities*

24. **Stocktaking** of all past, ongoing and pipeline climate change investments was undertaken as part of PPCR preparatory activities. This included a consultative review with key government agencies and national and international development partners and desk review of key documentation. This section provides a brief summary of the main initiatives.

### *Strategic planning for climate change*

25. **Existing strategies and plans:** Mozambique has developed a number of strategies to address climate risks. At the macro-level, the Government of Mozambique (GoM) addressed disaster risk in the *Action Plan for the Reduction of Absolute Poverty 2006-2010 (PARPA II)*. GoM is currently preparing the next Five Year Development Plan and a third PARPA<sup>25</sup> was approved by government in early 2011 that addresses climate risks. One of the strategic objectives of PARPA 3 is to support the adoption of measures to '*prevent and adapt to climate change*'. This document assigns responsibility for leading progress on this objective to the Ministry of Agriculture (MINAG). Meanwhile, the Ministry for Coordination of Environmental Affairs (MICOA) has prepared a National Action Programme of Adaptation<sup>26</sup> to Climate Change<sup>27</sup> (NAPA) in 2007 that laid the foundations for a multi-stakeholder adaptation agenda with four priorities:

- Strengthening early warning systems.
- Strengthening the capacity of farmers to deal with climate change
- Reduction of the impacts of climate change along the coastal zone
- Water resources management.

26. **Gender, Environment and Climate Change Strategy and Action Plan.** The Government of Mozambique has demonstrated strong commitment to gender issues, and with the integration of gender into legislation, policies and strategies with a climate change and environmental lens. As a vivid example, in 2010, the Government of Mozambique approved the **Gender, Environment and Climate Change Strategy and Action Plan**, with the aim of insuring equality between women and men, and boys and girls, to access and control of natural resources, technologies for climate change adaptation and mitigation, and to benefits and opportunities for development, through sustainable use of natural resources for the combat of poverty. Through their empowerment, the **Gender, Environment and Climate Change strategy and Action Plan** aims at promoting gender equality and equity and enhance the participation of women and poorer communities in natural resources preservation, environment management, and in actions for climate change mitigation and adaptation. Built on the principles adopted by the Gender Policy and its implementation

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<sup>25</sup> GoM (2011) Action Plan for Reducing Poverty 2011-2014.

<sup>26</sup> National adaptation programs of action (NAPAs) provide a process for Least Developed Countries (LDCs) to identify priority activities that respond to their **urgent** and **immediate** needs to adapt to climate change – those for which further delay would increase vulnerability and/or costs at a later stage.

<sup>27</sup> *National Adaptation Program of Action (NAPA)*, Ministry for the coordination of Environmental Affairs (MICOA), December, 2007

strategy, approved by the Council of Ministers in 2006, and the Environment National Policy, approved by the Council of Ministers in 2005, **the Gender, Environment and Climate Change Strategy and Action Plan** has adopted the following principles: i) Equity, ii) No discrimination; iii) Gender mainstreaming, iv) Ecologic asset, v) Participation in natural resources management and benefits, vi) Sustainable development, vii) Adaptation and mitigation as a learning process.

**27. Future strategy development:** INGC and MICOA have recently prepared a proposal<sup>28</sup> to develop a national strategy to respond to climate change. It is anticipated that this will address sectoral policies, propose revisions to the legal framework to adjust fiscal policies and measures to engage the private sector. MICOA have also prepared a national '**Program Assistance to Climate Change**<sup>29</sup>.' This is still at draft stage pending further consultations with other line ministries and civil society and is likely to address:

- Preparation of a National Climate Change Strategy and Implementation Plan.
- Pilot initiatives on climate change.
- Capacity building for international negotiations on climate change and for preparing projects to access to international climate change funds.
- Knowledge management.
- Disaster risk planning.

**28.** Mozambique is committed to 'bringing together' planning on disaster risk and climate resilience. Synergies between disaster risk management and climate resilience have grown during the past 2 years and the NAPA highlighted the need to strengthen early warning systems as the first priority for intervention. INGC has identified the need to move towards a more integrated climate risk management approach, ranging from preparedness and disaster mitigation to broader adaptive activities, and taking into account the changing pattern of natural hazards in its disaster risk management planning process. In its recognition that climate resilience is not just about the far future, the INGC also wants to accelerate the implementation of corrective disaster risk management activities, addressing actual risks that are already well consolidated. INGC has recently prepared a USD 5 million *Disaster Risk Management Plan*<sup>30</sup> - aimed at building policy, strategies, and institutions; identifying, assessing and monitoring risks; and reducing underlying risk factors. The first \$1.2 million contribution to this plan is currently being provided by the Global Facility for Disaster Risk Reduction (GFDRR).

**29. Strategic Environment and Assessment (SEA):** There are currently several SEAs under preparation or planned for Mozambique and a Strategic Environmental and Social Assessment (SESA) will be undertaken to cover the SPCR program. Specifically, the Mozambique Spatial Planning TA Project financed by the World Bank will prepare a national umbrella SEA and six "development corridor" SEAs; including one in the Zambezi Basin and one along the Beira corridor: two of the three geographical areas in which PPCR Phase II

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<sup>28</sup> *Responding to Climate Change in Mozambique: Project Proposal INGC Phase II*, National Institute for Disaster Management (INGC), JUNE 2009

<sup>29</sup> Ministério Para A Coordenação da Acção Ambiental. (2011). *Programa de Assistência As Mudanças Climáticas*. MICOA, 28 Abril de 2011

<sup>30</sup> Mozambique Country Disaster Risk Management Plan. World Bank. 2009

support plans to focus. PPCR preparation activities are working to ensure that implementation of these various activities will be coordinated with the relevant government agencies and the teams preparing the investment sub-projects of SPCR support.

### **Studies**

30. Various studies have been undertaken, or are underway, and these are contributing to a gradual improvement of the evidence-base for shaping investments in climate change action. For example:

- **The INGC** executed a world-class biophysical study on the *“Impact of Climate Change on Disaster Risk<sup>31</sup>”*. The study was financed by **Denmark, UNDP and GTZ** and used ‘downscaled’ climate models<sup>32</sup> to provide information on cyclone activity, sea level rise, river hydrology and agricultural land use. It identified a range of potential impacts across different sectors but did not develop precise recommendations about adaptation options and associated costs. A Phase 2 study is ongoing by INGC and it is anticipated this might provide sharper regional clarity and contribute substantively to the development of some form of national climate change strategy. The INGC Phase I study focuses on a substantial subset of Mozambique’s disaster prone areas and how their vulnerability might be affected by climate change. The agricultural sector stands out in this analysis as particularly vulnerable.
- **Denmark** is also preparing a new environment project with MICOA and INGC, which will have a substantial climate change component with co-financing from the European Commission. The climate change component will finance strategy development as well as investments on the ground following recommendations from INGC phase II.
- **The Global Facility for Disaster Reduction and Recovery** has funded a World Bank-executed study on *“Economic Vulnerability and Disaster Risk Assessment (2009)<sup>33</sup>”*. This study calculated the historic economic impacts of climate shocks, droughts and floods and also contributed methodological approaches for cyclone analysis and flood plain modelling (using digital elevation models). A later study executed by the World Bank (see below) used this data set as a baseline scenario for estimating the future economic costs of adaptation.
- **The United Kingdom, Netherlands and Switzerland** have funded a study (implemented by World Bank) on *“The Economics of Adaptation to Climate Change<sup>34</sup>”*. This was undertaken as part of a global study that also included country case studies in Bangladesh, Bolivia, Ethiopia, Ghana, Samoa and Vietnam. The Mozambique country case study analysis generated adaptation cost estimates for each sector and focused on agriculture, roads, hydropower and coastal zones. The

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<sup>31</sup> INGC (2009). *Main report: INGC Climate Change Report: Study on the impact of climate change on disaster risk in Mozambique*. [Asante, K., Brito, R., Brundrit, G., Epstein, P., Fernandes, A., Marques, M.R., Mavume, A., Metzger, M., Patt, A., Queface, A., Sanchez del Valle, R., Tadross, M., Brito, R. (eds.)]. INGC, Mozambique.

<sup>32</sup> For detail, see *‘Climate change modeling and analyses for Mozambique, Final report’* detailing the support provided to the *Instituto Nacional de Gestão de, Calamidades (INGC)* adaptation to climate change project

<sup>33</sup> GFDRR (2009). *Economic vulnerability and disaster risk assessment in Malawi and Mozambique: Measuring Economic Risks of Floods and Droughts*. Global Facility for Disaster Risk Reduction and Recovery, World Bank, RMSI, IFPRI

<sup>34</sup> World Bank (2010). *Economics of Adaptation to Climate Change: Mozambique*. World Bank, Washington D.C.



study also included a cyclone assessment and analysis of the social dimensions of climate change. This study estimated that the impact of climate change on economic growth would cause annual losses in the region of \$400 million to 2050 and ‘... GDP falls of between 4 per cent and 14 per cent relative to baseline growth in the 2040-50 decade if adaptation strategies are not implemented.’

- **The World Bank** has supported the development of a national water resources strategy<sup>35</sup> and a study on “*Making Transport Climate Resilient for Mozambique*” (part of a sub-Saharan Africa initiative). The latter provides a detailed engineering assessment of the impact of climate change on roads infrastructure and of different adaptation options.

### ***Institutional strengthening and mainstreaming climate change planning***

31. **The Africa Adaptation Programme (AAP):**<sup>36</sup> The goal of this major regional programme is to enhance the adaptive capacity of vulnerable countries, promoting early adaptation action and laying the foundation for long-term investment to increase resilience to climate change across the African continent. AAP is managed by the United Nations Development Programme (UNDP) and is funded by the Japanese government<sup>37</sup>. Other UN agencies, including the World Food Programme and UNIDO are also expected to play an important role in delivery. Mozambique is a participating country<sup>38</sup> in this initiative and will benefit from support to help develop planning mechanisms, institutions, policies, financial options, and knowledge base needed to respond to climate change in the years to come. Various other UN agencies also support an environmental mainstreaming and adaptation project that provides support to the Ministry of Agriculture (MINAG), INGC and the National Meteorology Institute (INAM)<sup>39</sup>. UNDP also supports an initiative designed to strengthen local risk management and to mainstream disaster risk reduction across government<sup>40</sup>.

### ***Other support***

32. **The United Kingdom’s Department for International Development (DFID)** is supporting a range of different climate change interventions and supporting the development of some new initiatives. An initiative called ‘*Mainstreaming Climate Change into Development*’ is currently under preparation and will help Government to coordinate the climate change agenda, participate in international climate change negotiations and model future climate

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<sup>35</sup> Mozambique Country Water Resources Assistance Strategy: *Making Water Work for Sustainable Growth and Poverty Reduction*, The World Bank, August 2007

<sup>36</sup> The full name of this programme is “*Supporting Integrated and Comprehensive Approaches to Climate Change Adaptation in Africa*”. The program will work with 20 African countries and has a budget of US\$92.1 million over three years. It will fund national activities supported by regional services.

<sup>37</sup> *Africa Adaptation Programme: Climate Change Adaptation Action and Mainstreaming in Mozambique*, Government of Mozambique and the United Nations Development Programme (UNDP), 2009

<sup>38</sup> The 21 participating countries are: Burkina Faso, Cameroon, the Republic of Congo, Ethiopia, Gabon, Ghana, Kenya, Lesotho, Malawi, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Tanzania, Tunisia, and Zambia.

<sup>39</sup> Joint Programme: Environmental Mainstreaming and Adaptation to Climate Change in Mozambique, FAO, UNDP, UNEP, UN/HABITAT, UNIDO, WFP, Ministry of Coordination and Environmental Affairs (MICOA), Ministry of Agriculture (MINAG), National Disaster Management Institute (INGC), National Meteorology Institute (INAM), 2008

<sup>40</sup> *Strengthening Local Risk Management and Mainstreaming Disaster Risk Reduction*, Government of Mozambique National Disaster Management Institute and United Nations Development Programme Bureau for Crisis Prevention and Recovery, 2009

outcomes. DFID is also supporting the *Zambezi Floodplain Management Programme* – a project that is implemented by Save the Children. DFID also supports a number of regional and global projects that work in Mozambique, or will do so in future. These include the *Africa Climate Change Research Partnership* (under preparation), the *Climate Development Knowledge Network* - a technical assistance and advisory support mechanism, the *Adaptation Learning Program for Africa* (implemented by CARE in Mozambique) and the *Africa Climate Change Resilience Alliance* implemented by a consortium comprising Oxfam GB, the Overseas Development Institute (ODI), Save the Children, CARE International and Word Vision International. This operates in selected districts in Mozambique.

**33. Consultations:** The first joint mission of the PPCR held discussions with a range of Government entities, civil society organizations, the private sector, and development partners and extensive consultative processes have already been undertaken in previous climate-related analytical and capacity building work. Consultations with NGOs and the private sector revealed that there is limited awareness of the practical challenges posed by climate variability. Two other consultation exercises took place during a) the preparation of the Disaster Risk Assessment phase 1 by the Disaster Risk Management Institute (INGC) and b) the National Adaptation Program of Action (NAPA) undertaken by MICOA.

**34. The National Adaptation Program of Action (NAPA)** provides a clear vision of the country's priorities but lacks some sectors and a proper costing of adaptation options. The four priorities identified by the NAPA are robust, but they miss some important sectors such as roads. Other sectors might be important too but have not yet been examined through the lens of quantitative assessment of climate change impact.

**35. Investments in climate resilience** are ongoing in different sectors. For example, all-weather roads are under construction in the Zambezi valley between Tete and Mutarara; and soil and water conservation techniques are being tested in different provinces. Investments in irrigation, coastal protection and drainage for coastal cities are also being prepared. However, the scale of need is enormous and beyond the current capacities of the respective ministries or municipalities and will require additional financing. Moreover, at the provincial level, there is room for more coordination between investments in the agriculture and transport sectors. A territorial focus for investments would help address synergies and see the real benefits of resilience.

**36. Donor coordination.** An active donor working group on environment and climate change exists, aiming at harmonizing support to Government on environmental issues in general and encompassing climate change portfolios. Out of this large group, a smaller group of donors comprising Agence Française de Développement (AFD), DANIDA, DFID, UNDP, World Bank and African Development Bank are discussing coordination arrangements among the different projects mentioned above.



## Section 4: Rationale for PPCR support

### 37. **PPCR support can play a catalytic role in promoting climate-resilient growth strategies.**

Mozambique is one of the poorest countries in the world and is also extremely vulnerable to climate change. Against this backdrop, climate change impacts could slow and even reverse the progress made in recent years on poverty reduction in Mozambique. PPCR resources can be used to identify opportunities that can be piloted in priority areas and sectors and then scaled to the national level. Unfortunately, most of the mainstream development funding from government, private and donor sources does not provide the flexibility to develop and explore new approaches. The approach adopted in the design of this program is to fully-integrate climate resilience into mainstream development investment – in agriculture, natural resources management (including water), coastal infrastructure development, roads, and private sector investment.

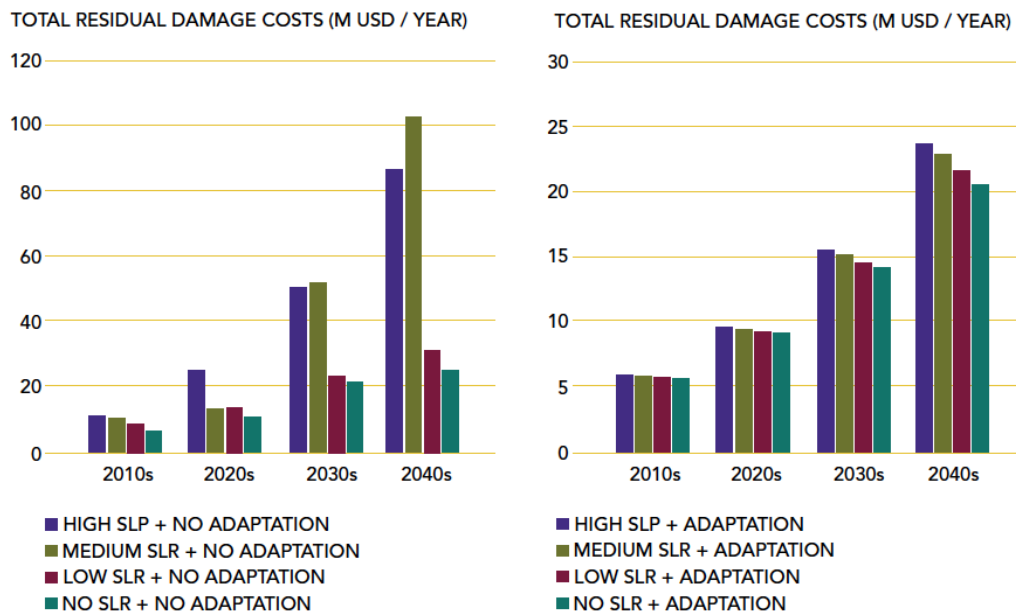
**38. Mainstreaming climate resilience and gender:** A particular focus of sub-project design will be placed on gender aspects, as climate change can exacerbate existing inequalities. For example, in agriculture, women primarily grow crops for household food security and thus will be the main targets in building resilience in this sector; climate resilient road design and upgrading will consider gender dimensions, such as access to health centres and schools - particularly important for pregnant women and girls education respectively. Private sector investment in forest management will prioritize the development of appropriate land and forest rights to ensure that women – the primary direct users of forest resources, are central to decisions over their management and share equitably in the services and benefits they deliver.

**39. Geographical priorities:** Mozambique's 2700 kms of coastline is vulnerable to the combined impacts of rising sea levels and coastal storms and surges and the impact of increasing climate variability is projected to have serious implications for agriculture, transport and other sectors. Geographically, all of Mozambique will experience some form of climate change. Further work using vulnerability mapping is needed to better identify priority areas for investment and combating climate change. However, some geographical priorities for early action can already be identified, and it is these areas where piloting for wider transformational take-up might be focused. These are a) the city of Beira – the second most populous urban area in Mozambique, and yet extremely vulnerable to coastal storms, cyclones and sea level rise; b) the productive agricultural lowlands along the Zambezi and Limpopo river corridors; and c) the semi-arid drylands of Gaza, where the effects of drought on agricultural production and livelihoods are already evident.

**40. Sectoral priorities:** The NAPA, INGC Phase 1 study, and the recent economic analysis of climate change adaptation have improved the evidence base for climate adaptation planning. They make a strong case for investments now in adaptation to reduce the scale of future impacts to the poor and to Mozambique's fragile economy. Figure 7 shows estimated residual damage costs with and without adaptation based on economic analysis undertaken by World Bank. Careful prioritization of adaptation investments can reduce overall investment needs – a crucial consideration, given the scarcity of investments funds available. The World Bank study identified roads, agriculture and coastal infrastructure as priority sectors for support. The study was by no means comprehensive – for example, it did not cover natural assets (such as fisheries and forests), health or urban issues. Some sectoral impacts identified by the INGC Phase 1 and World Bank studies are highlighted below:

- **Roads:** Sealing unpaved roads reduces the worst-case climate change damages substantially. The study considered a number of options for "climate-proofing" roads, given

resource constraints and the trade-offs between improving “basic access” and having “fewer but stronger” roads. The conclusion is that Mozambique would be advised to focus investments on climate-proofing specific areas, such as culverts and low lying sections prone to flooding, to ensure that designs minimize broader erosion risks, and to set aside some funds from the investment budget for additional maintenance so that basic access roads can be quickly repaired following heavy rainfall.



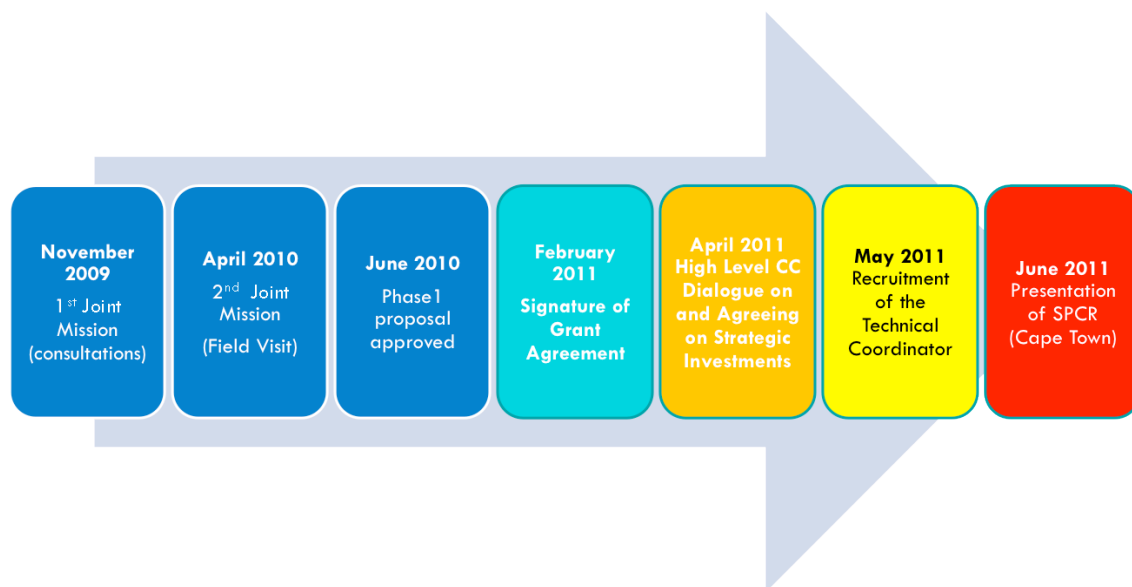
**Figure 7: Estimated total residual damage costs for four scenarios, with and without adaptation investment.**

- Agriculture:** Remaining welfare losses could be regained to a significant extent with improved agricultural productivity. Economic analysis suggests that investments in irrigation might not be cost-effective – given difficulties in access to credit and the poverty of most farmers. Less costly approaches such as water harvesting, soil/moisture conservation, and agroforestry and farm forestry might prove to be better investments for building climate resilience in the medium term. Improved woodland and forest management will also have broad impacts on the resilience of land and on water absorption capacity. Other, “softer” strategies include support for improved access to markets and inputs, value addition for agricultural and forest products and reduction of post-harvest losses. Improved livestock and fisheries productivity are other options worth exploring in more detail.
- Coastal infrastructure:** A phased approach to protection of key coastal economic assets (e.g. ports and cities) is likely to be required, combining improved land use planning and “soft” infrastructure. Dikes should be installed or upgraded only where absolutely necessary to protect current, immobile, vital infrastructure (like the port of Beira) and where possible protected by regeneration of ‘green assets’ such as restoration of mangrove forests and regeneration of dune vegetation. Plans for urban drainage in coastal cities will also need to be reviewed through a climate resilience lens – ensuring these adopt sufficient design criteria sufficient to ensure they can operate effectively under future climate scenarios. In the case of central Mozambique, this will mean that drainage systems will need to be upgraded to accommodate more intense rainfall events.

## Section 5: Mozambique's Strategic Program for Climate Resilience (SPCR)

### *Rationale and Objectives*

41. **Preparation:** Figure 8 outlines the different stages of SPCR preparation. Design of Mozambique's SPCR started with the first joint mission in November 2009 during which initial consultations took place to identify the broad scope of SPCR design options. The second joint mission included field visits and this took place during April 2010 with approval of Phase 1 funds following in June 2010. Following the signature of the grant agreement in February 2011. Initial drafting and agreement in principle on the draft SPCR and suite of strategic investments taking place during April 2011. Consultations on the second draft of the SPCR were then coordinated by MPD and MICOA at regional and central level in May 2011.



**Figure 8: Preparation steps for the Mozambique SPCR**

42. **Mainstreaming climate resilience:** The SPCR, targeted at low-income countries, which are highly vulnerable to climate risks, seeks to support the *mainstreaming* of climate resilience into development through piloting and demonstration investments. Programming guidance emphasises that programs must be country led, designed within the broader context of sustainable development and poverty reduction, and build on existing work, including disaster risk reduction strategies and *National Action Programs for Adaptation* (NAPA), where these exist.

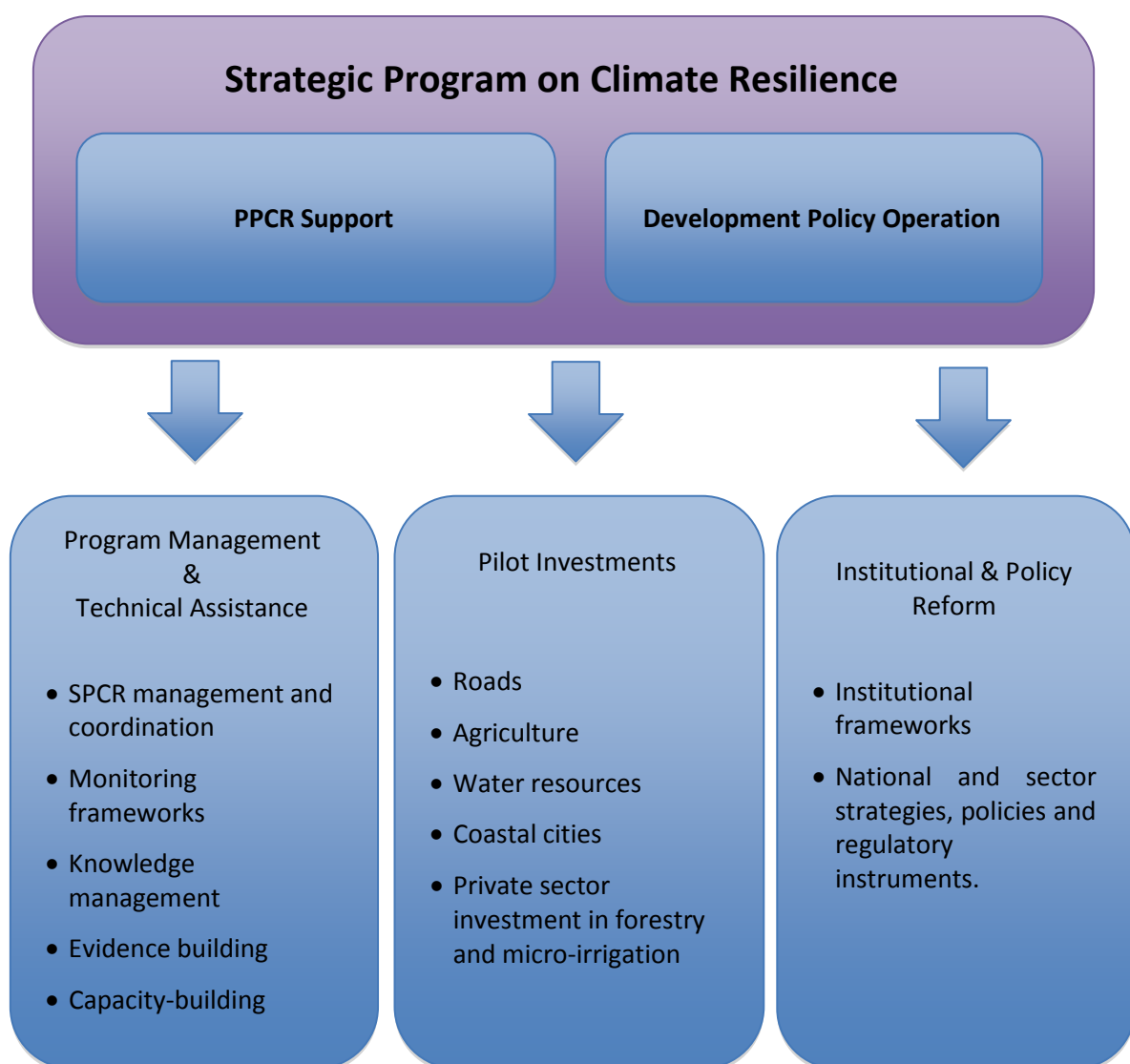
43. The objectives of SPCR support will be to

- **Strengthen the evidence** - base for climate resilience policy-making and planning,
- **Develop models and experience for building climate resilience** in selected infrastructure, agriculture and natural resource management systems, based on investments in the key productive regions of the Limpopo and Zambezi valleys, and of vulnerable coastal cities.

- Stimulate additional private sector investment in climate adaptation options;
- **Improve institutional frameworks** for addressing climate change (with support from climate change development policy operation *i.e.* sector budget support); and
- **Strengthen capacity** for climate resilient planning at national, sector and local levels.

44. To achieve these objectives, the SPCR includes a blend of technical assistance, investments support and policy lending through a Development Policy Operation (DPO) – the latter to underpin efforts to put in place an effective institutional, policy and regulatory framework for climate change. Part 2 provides background on future DPO development. Figure 9 outlines the three pillars of the SPCR.

**Figure 9: The three pillars of the Mozambique SPCR**



### **Phase 1 activities**

45. **Phase 1 activities** are currently at planning and early implementation stage. Phase 1 activities are currently managed by a project-level implementation unit within MPD (on a transitional basis) and these activities will continue in parallel with the planning and implementation of Phase 2 and full implementation activities. Activities are designed to inform and add value **across the SPCR portfolio** of investment projects, to help prepare the SPCR (including addressing safeguard issues), inform detailed design work (to be funded by Phase 2) and to identify selected knowledge and capacity gaps. Some examples of Phase 1 activities include:

- **A Strategic Environmental and Social Assessment (SESA) of the proposed SPCR investment program.** This will identify practical measures to minimize environmental risks and to identify opportunities for environmental enhancement. It is anticipated that the SESA process will provide further opportunities for consultation and civil society engagement. The SESA will also scope environmental assessment processes for each of the sub-projects.
- **Assessing climate-resilient livelihood options** in drought prone areas in the Limpopo valley (to inform detailed design of adaptation investments).
- **Studies of private sector adaptation investment** options for ports, tourism, forestry and urban water supply.
- Support for PPCR coordinators in MPD and MICOA.
- **A national assessment of the impacts of sea level rise and storms on coastal resources:** to provide a solid analytical platform for climate resilient policy development and planning in the coastal zone

### **Phase 2 activities**

46. **Phase 2** will support a) detailed design of investment projects; b) projects ready for implementation; and c) technical assistance to pilot the mainstreaming of climate resilience into key sectors. Investment options are presented in Part 2 of this document and include investments in:

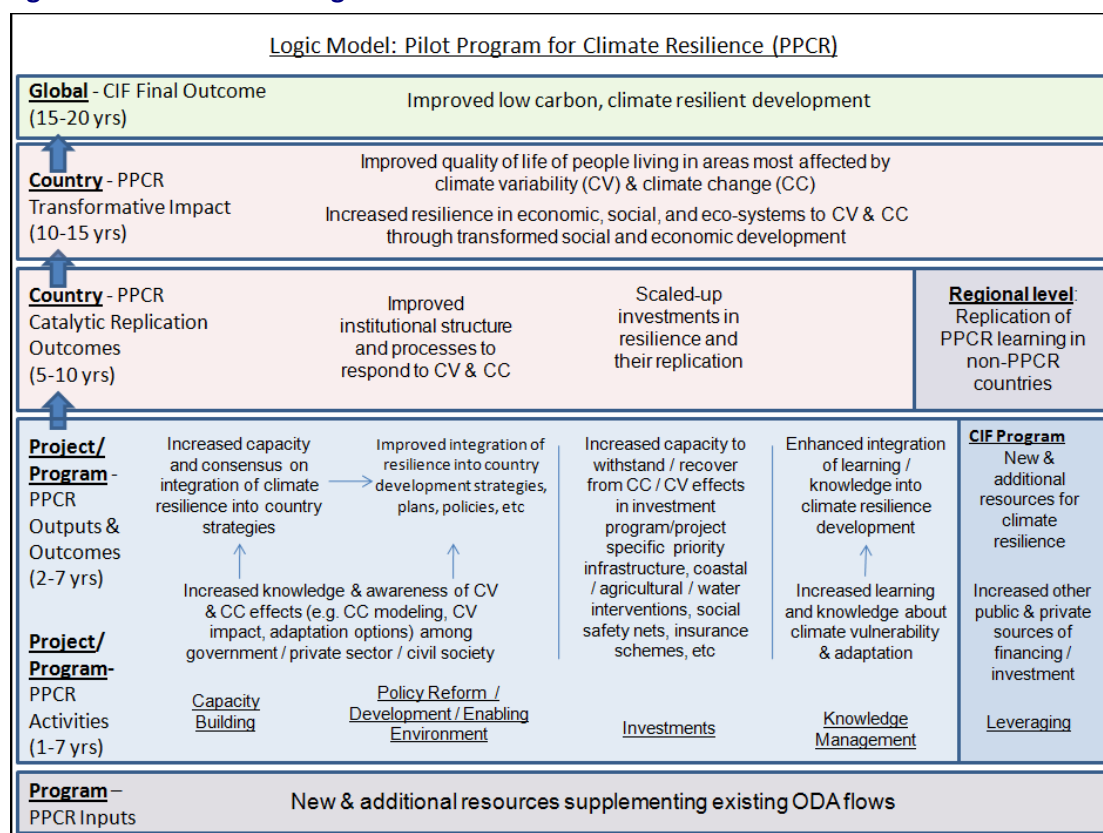
- **Transport** - building climate resilience into rural roads in the Zambezi valley
- **Agriculture** – development of climate resilient agriculture in drought-prone areas in Limpopo and stimulating private sector investment in micro-irrigation.
- **Water resources management** – community-based watershed management in Limpopo and strengthening hydro-meteorological systems in the Zambezi.
- **Urban infrastructure** – upgrading and sustainable financing of coastal infrastructure in Beira.
- **Forestry** – stimulating private sector investment in sustainable forest management to improve climate resilience.

47. **Knowledge management and evidence building will continue during** Phase 2 and throughout the full period of SPCR support, including the detailed design and implementation of measures to disseminate, discuss and mainstream relevant studies and pilot experience on climate adaptation. Additional studies will also be undertaken of impacts and adaptation options in the *health sector* and on exploring options for addressing climate resilience in *social protection* policy. Detailed design of knowledge management

measures will explore institutionally-sustainable approaches to maximize potential for sustaining impact beyond the duration of SPCR support. For example, the University of Eduardo Mondlane and INGC are cooperating on the development of a climate change knowledge centre, and further discussions will be needed to harmonize future SPCR support with these proposals.

48. **Program management:** Phase 2 will support detailed design and day-to-day program management support. This will include the design and implementation of a programmatic monitoring and evaluation covering vulnerability measures and the impact of SPCR-supported adaptation activities on resilience. The M&E framework will include the whole SPCR portfolio. Design will integrate closely with detailed design of sub-projects during Phase 2 to ensure full integration of indicators.

**Figure 10: PPCR Generic Logic Model**



49. **Capacity building:** Detailed design during Phase 2 will integrate capacity building into all technical assistance and investment sub-components. The SPCR will complement and support a number of other projects and programs that include substantial capacity-building components - including initiatives undertaken by MICOA and supported by AAP and DFID.

50. **Geographical focus** - Most investments will be focused in the Limpopo watershed and the Zambezi valley where there are substantial climate risks associated with floods and drought. Coastal protection and storm water drainage investment are proposed for Beira city as this urban area has been identified as particularly vulnerable to coastal storms, typhoons and sea level rise.





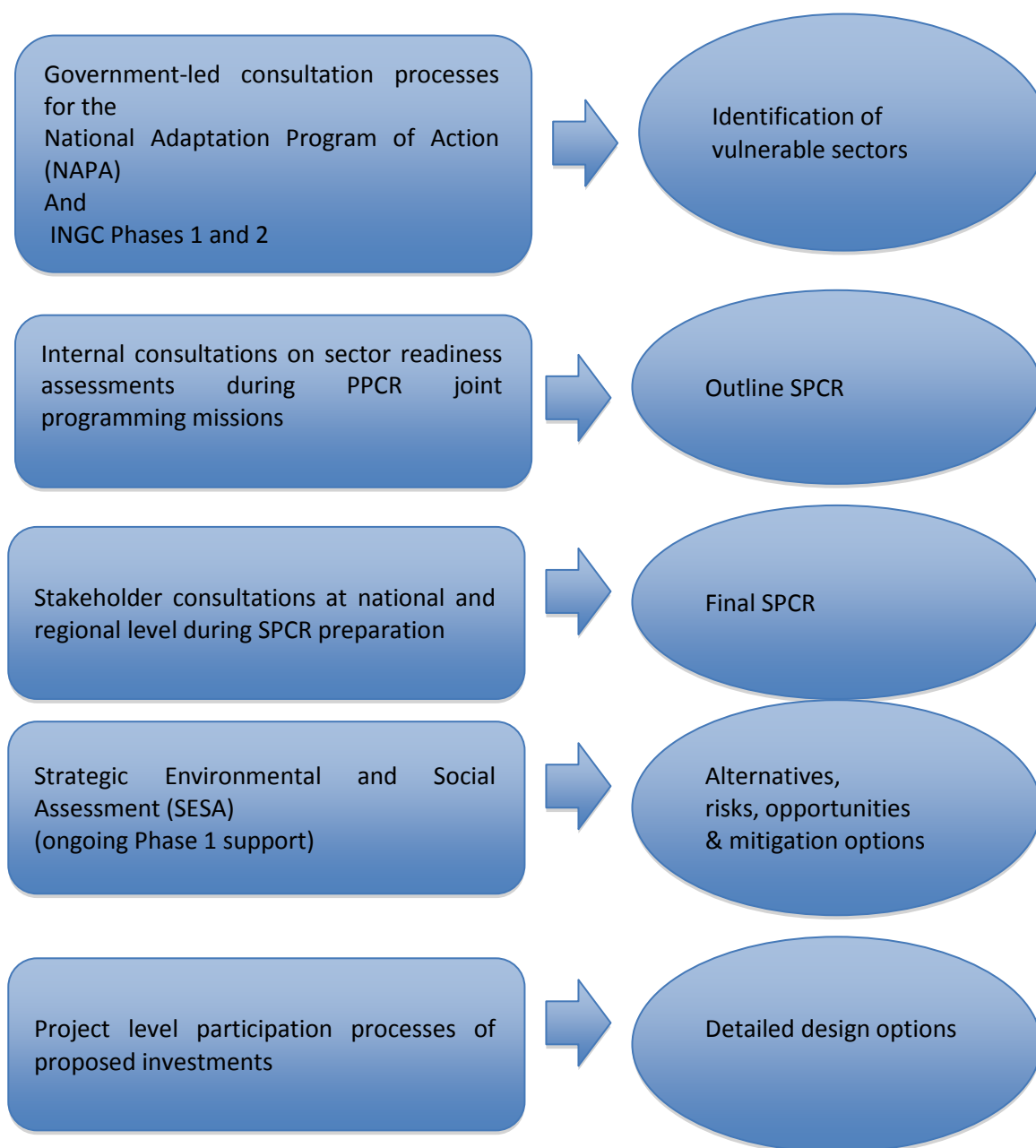
The ports of Beira, Maputo and Nacala are vital to Mozambique's economic growth. Research will be needed to ensure that embankments and revetments are capable of withstanding higher sea levels.

**51. Experience and lessons learned:** Linked to the M&E framework, mechanisms and budgets will be identified to ensure that analytical products, lessons and experience are shared across national and international partners. Regional dissemination and sharing is anticipated to be a feature of the knowledge management framework, including with SADEC countries, given the importance of trans boundary water and natural resource management issue.

**52. Knowledge management.** PPCR will promote the culture of research, dissemination of knowledge among all the stakeholders (academia, government departments, research institutions, etc.) involved in climate change adaptation, environmental management and disaster risk reduction, by supporting the creation and functioning of the Climate and Disaster Risk Management Research Center (**CICLAR**) under creation. Based at INAM, and as part of the INGC phase II component, this center aims at promoting applied research on Climate Sciences and Risk Assessment in Mozambique, and will cover research on Earth, Ocean and Atmospheric Sciences.

## Section 6: Participatory Process Followed for the Development of the SPCR

53. Annex 1 provides a summary of the various consultation exercises undertaken during SPCR presentation. SPCR preparation built on the platform of stakeholder consultation undertaken during NAPA and INGC Phase 1 preparation. These processes engaged the participation of a wide range of stakeholders at national, provincial and local levels and scoped the focus of subsequent work undertaken during SPCR preparation. Figure 11 summarizes the sequencing of participatory processes during SPCR preparation.



**Figure 11: Participatory processes involved in SPCR development**



54. **Consultation processes on an early draft of the SPCR** took place with government stakeholders and international, civil society and private sector groups at central, provincial and municipal level in May 2011. These consultations proved especially useful on a number of issues. For example, the consultations provided the first opportunity to present for discussion proposed institutional arrangements for coordinating work across government on SPCR delivery (and more broadly, on climate change governance) and there was broad support for these arrangements. The consultations also helped to identify potential roles of specific organizations and initiatives, for example on the role that Eduardo Mondlane University might play in the design and delivery of knowledge management activities. A number of stakeholder groups emphasised the need to strengthen attention given to gender issues throughout SPCR delivery. Specific provisions on gender are already included for each of the investment sub-projects in Part 2 of the SPCR, but further emphasis is now also included in Part 1. These issues are now better reflected in the SPCR.

55. Consultations undertaken in May drew attention to the need to better understand a) the potential health impacts of climate change - including of vector-borne diseases (especially malaria), meningitis, cholera and impacts caused by malnutrition, and b) the potential role of emerging social protection systems in Mozambique (the development of which is being supported by the G19 donor partners) in helping lower vulnerability and build resilience to climate change. SPCR preparation has responded to these issues by including provision for analytical studies to build the evidence-base for future adaptive measures.

56. Among others, **CICLAR** will i) create function as center for validation of competences in the fields of hydrometeorology, environment, oceanography and other areas alike, as well as management of natural disasters and risk assessments; ii) support applied research and specialized training among several research groups and institutions by providing them tools and data; and iii) develop mechanism for knowledge exchange between its Members and Civil Society through discussion forums, virtual lectures and thematic conferences.

57. **Specific participatory processes will continue** - consistent with the recommendations of stakeholder consultations - detailed participatory and consultative processes will continue as part of the SESA process and subsequently as part of detailed project design of investment projects.

## Section 7: Institutional Assessment

### *Institutional Framework*

**58. Institutional coordination:** Climate change will have impacts across all sectors in Mozambique and so ensuring that appropriate adaptation plans are integrated across the economy will be a responsibility that must be shared by all line ministries and agencies. Currently, responsibilities are not well defined and legal and regulatory provisions for addressing climate change are fragmented across a range of different legal and regulatory instruments and institutional mandates. The Sustainable Development Council - *Conselho Nacional De Desenvolvimento Sustentável (CONDES)*, meets twice a year and brings together key line ministries and agencies at ministerial level. The council is chaired by the Prime Minister and could coordinate high level policy and planning on climate change. This is supported by a technical council *Conselho Técnico do CONDES* and is chaired by the Vice Minister of MICOA. Currently, there is no working level coordination unit although this is envisaged for the future. Figure 12 provides a simplified depiction of current institutional arrangements. At the coordination level, the MPD has responsibility for overall budget coordination and expenditure prioritization, whereas the MICOA<sup>41</sup> has responsibility for coordinating work on climate change and territorial planning - but not for implementation. INGC<sup>42</sup> coordinates work on disaster risk planning and management and other aspects of coordination fall under mandates of MICOA and other ministries and agencies. More specialized agencies also have coordinating functions. For example, the National Meteorological Institute (INAM) and the National Water Department (DNA) are in charge of the development and maintenance of the hydro-meteorological station network and have the responsibility for collecting and disseminating this information<sup>43</sup>.

**59. Mainstreaming climate change planning at local level:** Mozambique is undergoing a 'decentralization' as well as a 'de-concentration' process, with responsibilities increasingly delegated to district and municipal authorities. The Government sees the districts as '*polo de desenvolvimento*', and land planning at local levels is important for adaptation strategies. Detailed design of SPCR investments will therefore seek to ensure that support for climate resilient planning is targeted appropriately at these levels.

**60. Institutional capacity:** The considerable institutional progress made in reducing risks to extreme climate events through improved disaster risk reduction responses now needs to be replicated to address longer-term climate risks and challenges. The Mozambique component of the Africa Adaptation Program is making a start by focussing on building leadership, planning, management and budgetary skills amongst technical ministries but considerable additional investments will be needed to build effective sector plans, technical skills and implementation capacity.

**61. Institutional frameworks:** GoM currently lacks many of the necessary components of a

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<sup>41</sup> The Ministry for the Coordination of Environmental Action (MICOA) was created in 1994 to coordinate sustainable development, guide the exploitation, use, protection and management of natural resources, and develop appropriate policies, laws and public environmental awareness. MICOA is a coordination body and does not have implementing functions.

<sup>42</sup> INGC was created in 1999 as a public institution endowed with administrative autonomy. Its mandate is to direct and coordinate disaster management at the national level, especially concerning prevention and mitigation activities, as well as assisting disaster victims. The Institute is under the Ministry of State and Administration (MAE).

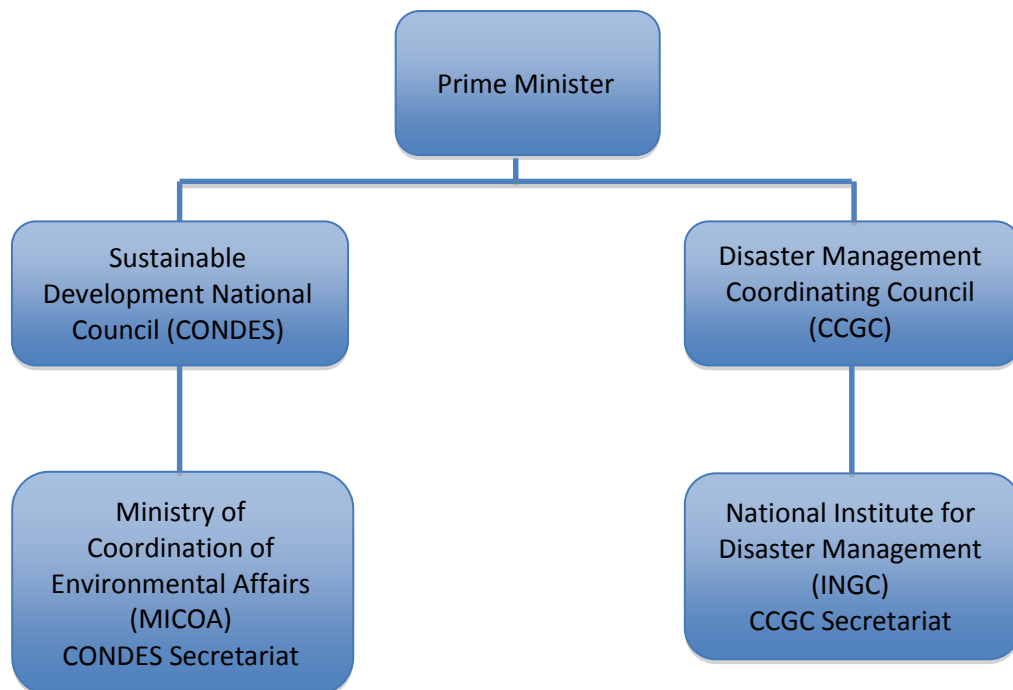
<sup>43</sup> There are currently 800 rainfall measurement (pluviometric) and 100 river monitoring (hydrometric) stations that are used to generate such information.

national institutional framework that will be necessary for developing effective national and sectoral policies and plans for addressing climate change. Foremost amongst these is the absence of a nationally agreed, cross-sectoral climate change strategy. Legal provisions for addressing climate change in the legislative framework are also at an early stage. For example existing mechanisms do not lend themselves to building consensus and ownership across government ministries and policy and planning coordination on climate change is also weak. Mozambique also lacks a nationally agreed climate change strategy that matches priority actions with institutional responsibilities and budget requirements.

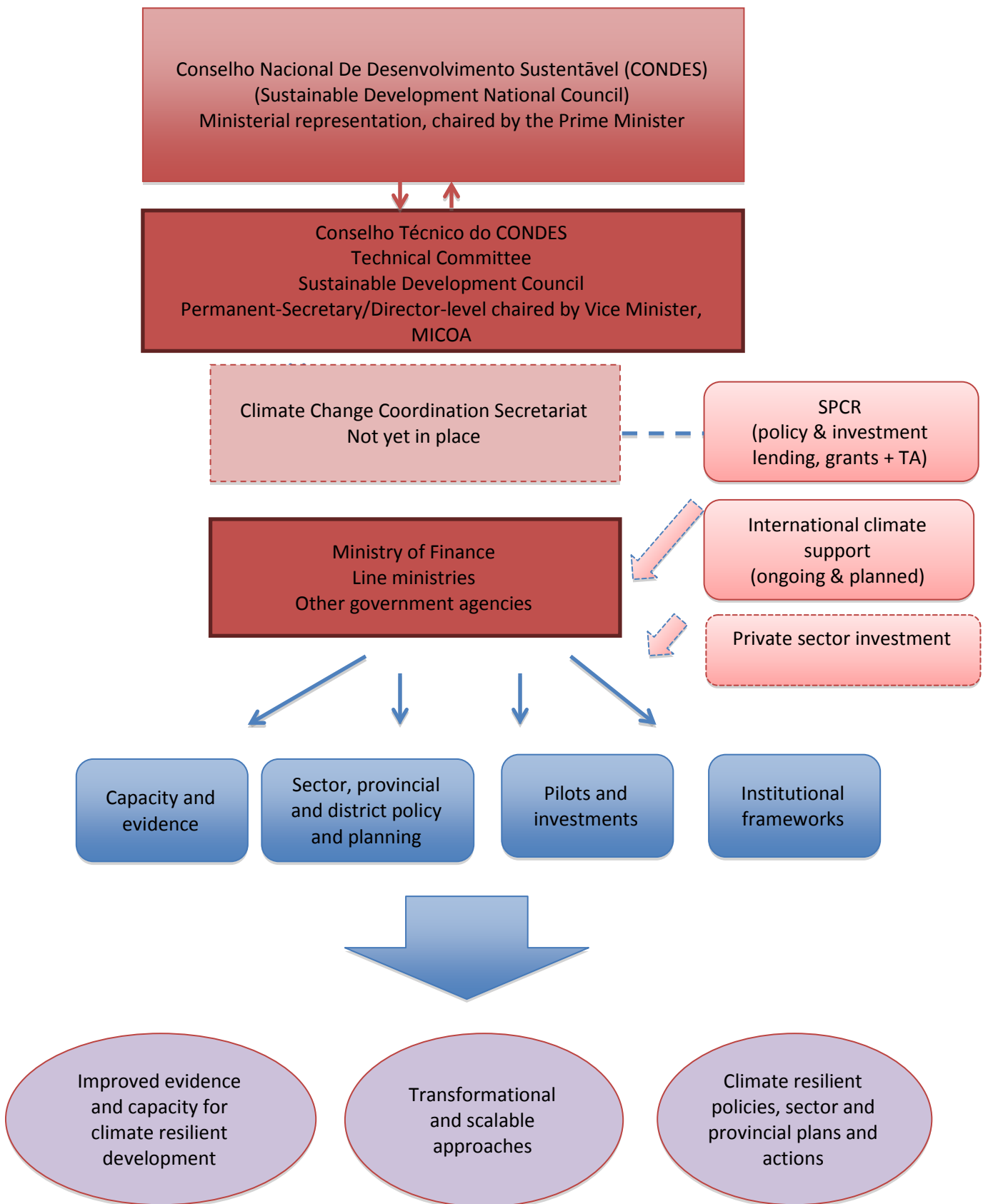
**62. Climate change governance:** Eventually, a high level steering committee of some form will be required to ensure that policy development is coordinated across government and that appropriate plans, budget allocations, implementation and reporting arrangements are put in place. At working level, coordination mechanisms are also needed to ensure effective use of both domestic and international allocations of climate financing and to ensure that climate resilience planning is better mainstreamed throughout policy and planning at different levels of government.

**63. The national institutional framework is evolving:** Discussions on institutional arrangements for addressing climate change are ongoing within government and much further work will be needed to elaborate and then put in place an effective framework. The SPCR envisages that this process could be supported by policy lending that supports the development of an effective institutional framework as well as the development of improved policies and strategic planning instruments. Figure 13 outlines what a future institutional framework might look like.

**Figure 12: Simplified outline of existing institutional arrangements for climate change**



**Figure 13: Indicative institutional framework for climate change**



## PART 2

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### PROPOSED INVESTMENT PROGRAM COMPONENTS FOR PPCR FINANCE

64. The three pillars of the SPCR are outlined below and Table 1 provides an overall summary of proposed intervention options to be considered for inclusion in the SPCR portfolio.

#### *Program Management and Technical Assistance*

- **Program management arrangements:** SPCR preparatory activities are being managed on a transitional basis by the Project Implementation Unit of the World Bank supported *Decentralized Planning and Finance Project* within the MPD. Once Phase 2 support is available, a national level Programme Coordination Unit, co-hosted by MPD and MICOA, will undertake program management. World Bank will supervise program management, the costs of which will be covered by Phase 2 grant funds (and therefore will not require separate board approval). MPD engagement on programme management will help ensure that knowledge and learning from pilot investments and studies are shared and mainstreamed into the planning of sector line ministries, provinces and districts. MICOA engagement will help ensure that activities are aligned to supporting a planned national climate change program – part of which will elaborate a national strategy and plan of action on climate change. MICOA engagement in program management will also help to ensure complementarity and effective coordination with other climate-related international donor support initiatives, including the Africa Adaptation Program and other bilateral support on climate change via MICOA.
- **Harmonization:** Management arrangements will work to ensure maximum harmonization with existing government systems and initiatives and it is anticipated that the unit will also have responsibility for coordinating technical level dialogue for planned DPO support. Management arrangements will be integrated fully with the government institutional framework for climate change governance as this evolves.
- **Monitoring and evaluation:** In the longer term, GoM systems for evaluating climate change will need to track the efficacy of national systems in climate risk management, monitor the proportion of development initiatives that are climate-proofed and identify mechanisms for targeting climate-vulnerable stakeholder groups. The SPCR will support measures that develop national capacity for climate adaptation monitoring whilst developing a programmatic framework for M&E of the SPCR. Design of the M&E framework will need to identify appropriate indicator sets that are appropriate to sub-investments and which might also be appropriate for wider use at national level. Examples might include: a) Numbers of beneficiaries of climate change adaptation interventions, b) Coverage of climate change adaptation interventions, c) Numbers of people experiencing reductions in vulnerability, d) Value of assets and economic activities made less vulnerable as a result of adaptation interventions, and e) Benefit/ cost ratios of adaptation options identified/ implemented.
- **Knowledge management:** Ensuring that lessons and experience from investment projects, analytical work and the work of other civil society agencies on climate resilience are distilled, shared and mainstreamed at national, provincial and local

level - government systems and civil society networks. To build sustainability in knowledge management, the design of this component will explore the possibility of support through national knowledge-sharing mechanisms and institutions, including the University of Eduardo Mondlane (UEM) and INGC. Linkages with global knowledge mechanisms and networks, such as the Africa Adaptation Program and the DFID-supported Climate Development Knowledge Network (CDKN) will also be explored.

- **Capacity building:** Contributing to institutional capacity building of initiatives that integrate climate resilience into government sector and provincial planning. Indicatively, this will focus on one productive sector (e.g. agriculture), one social sector (e.g. health) and provinces in the Limpopo and Zambezi valleys.
- **Knowledge gaps:** Technical assistance support will address key sectors and issues where further evidence is needed to identify adaptation options and investment needs. Ongoing studies include analyses of private sector opportunities for investment in ports, urban, water supply, forestry and tourism. Additional studies will focus on health and social protection and a coastal zone assessment will also be undertaken. Public expenditure review and social impact studies are also anticipated to inform design of policy lending support.

## Policy lending

65. The country is likely to receive increasing amounts of climate-related funds in the coming years. Given the critical need for institutional capacity building and policy dialogue on climate change planning, a potential Development Policy Operation (DPO) on climate change is also under discussion. A series of two DPOs for \$50 million each is envisaged over 4 years. The objective of the proposed operations will be to support progress in achieving policy reforms necessary for mainstreaming climate change throughout government policy – including the development of a national climate change strategy, supporting the development of a national institutional framework; and the development of sectoral strategies and action plans in selected sectors – such as water, energy and health; and to promote lower carbon intensity development. DPO-supported policy reforms will complement the portfolio of sub-project investments financed by the PPCR and will help the scaling-up of successful approaches to national level. Technical assistance and perhaps other development partners will support the proposed operation.

## Investment projects

66. In most cases, proposed investments have been designed to blend with existing or pipeline investments of the World Bank and AFDB. This will enable PPCR funds to 'mainstream' climate change into larger investment projects, thus achieving impacts at scale. Blending also helps to reduce overall transaction costs during processing and implementation and thus helps to ensure that investments deliver real value for money at the implementation level. Options developed by the International Finance Corporation (IFC) are at an earlier stage of development since IFC currently does not have a pipeline of projects suitable for blending with PPCR financing. Whilst discussions with prospective private sector investors have taken place for all investment proposals presented in Part 2, the early stage of development of these proposals and commercial sensitivities require that less detail is presented at this stage.

67. **The selection of options** developed by World Bank, African Development Bank and International Finance Corporation cover sectors identified as particularly vulnerable to

climate change by previous studies, particularly the INGC Phase 1 study, the NAPA and by the World Bank's recent study on the economics of climate change. Leveraging potential of PPCR financing was also a consideration. The selected projects have varied levels of co-financing depending on the sector and project. The concept proposals included in the proposed SPCR portfolio will leverage an additional \$304 million with a with the PPCR contribution of \$100 million. Geographical coverage of investment projects is shown in Figure 14. The sectors included for proposed investments include:

- Agriculture
- Transport (rural roads)
- Urban (coastal cities)
- Water resources management



Figure 14: Map showing geographical locations of investment projects.





**Table 1: Summary of proposed investment and technical assistance options for inclusion in Phase 2 of the Mozambique SPCR (in USD million).**

| Investment (Indicative)   | Project | Lead MDB | Total project cost (indicative) \$ Million | Co-financing (indicative) \$ Million | Source       | Total PPCR request (indicative) \$ Million |
|---|---------|----------|--|--------------------------------------|--------------|--|
| <b>Investment Project Options</b>   |         |          |  |                                      |              |  |
| 1. Introducing climate-resilience into the design and management of Mozambique’s unpaved roads  |         | WB       | 35   | 15                                   | IDA          | 20   |
| 2. Coastal cities and climate change  |         | WB       | 100  | 40                                   | IDA          | 20   |
| 3. Climate-resilient water-enabled growth: transforming the hydro-meteorological services   |         | WB       | 15   | 5                                    | IDA          | 10   |
| 4. Sustainable Land & Water Resources Management  |         | AfDB     | 40   | 20                                   | ADF          | 20   |
| 5. Enhancing Climate Resilience Agricultural Production and Food Security   |         | AfDB     | 45   | 25                                   | ADF          | 20   |
| 6. Developing climate resilience in the agricultural and peri-urban water sectors through provision of credit lines from Mozambican banks |         | IFC      | 10   | 5                                    | IFC, private | (5*)                                       |
| 7 (a-c). Developing community climate resilience through private sector engagement in forest management.                                  |         | IFC      | 24   | 19                                   | IFC, private | (5*)                                       |
| Program Management and Technical Assistance   |         | WB       | 3.5  | 1.5                                  | Bilateral    | 2  |
| Policy lending (DPO)  |         | WB       |  | 100                                  | IDA          | 0  |
| <b>TOTAL (\$ million) Indicative</b>  |         |          | <b>272.5</b>                               | <b>230.5</b>                         |              | <b>102</b>                                 |

NB: The combined total of PPCR contributions for IFC project options will not exceed \$10 million.

## Investment Project 1: Introducing climate-resilience into the design and management of Mozambique’s unpaved roads

### **Basic project information:**

Government implementation agencies: The Road Fund (FE) and the National Roads Authority (ANE)

Responsible MDB: World Bank

Total project cost: \$35 million

PPCR request: \$20 million

Co-financing: \$15 million

### **Summary**

Mozambique’s classified network of approximately 24,000 kilometres of unpaved roads is particularly susceptible to climate- and weather-induced problems. Economic analysis of climate adaptation options strongly suggests that investments that will improve the climate resilience of Mozambique’s roads will be cost-effective and will help ensure that rural populations do not become further isolated from markets and services (schools and health centres).

This investment project will pilot a range of different approaches that could improve the climate resilience of Mozambique’s rural roads in a cost-effective way. It will focus on identifying and piloting highly-targeted interventions for roads and associated structures – including a) different construction techniques for roads and associated structures, and b) innovative response mechanisms - including an emergency response fund and streamlined administrative and procurement procedures to ensure that roads are repaired and restored quickly following severe weather damage. Sub-project pilots will target the rural road network in the lower Zambezi valley, between Caia and Songo and will be integrated with an ongoing, World Bank-supported agricultural development project<sup>44</sup> to realize synergies for agricultural production and livelihoods. This will also minimize additional costs for project management and monitoring.

### **Development objective(s)**

Improve climate resiliency of Mozambique’s unpaved rural road network and generate the evidence-base needed to guide adaptation strategies for the national road sector.

### **Components and activities**

Components and activities will be identified during detailed project design. Indicatively, these will consist of:

- **Identifying sections of road and associated structures most vulnerable** to rupture and those most in need of urgent remedial actions based on broader development considerations – such as their importance for access to health centres, schools and markets, especially for women and children.
- **Design and piloting of appropriate and cost-effective engineering and adaptive maintenance approaches:** This will include i) increasing the paving of roads with durable seals such as otta seals, geo-cells, penetration macadam, particularly in areas prone to flooding and heavy rainfall events, ii) flood protection measures for bridges and drainage structures, iii) selective raising of road embankments, iv)

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<sup>44</sup> The World Bank Smallholder Market-led Development Project – this initiative has a GEF component dedicated to adaptation to climate change.

designing new structures to improve over-topping resistance and, conversely, to pilot the use road infrastructure to retain water during dryer periods as a means of increasing access to water sources for local populations during drought. These 'hard' measures will be complemented by measures to adapt maintenance approaches to improve preventative actions such as clearing river channels around bridges and other drainage structures to improve flow characteristics and use of vegetation as a means of improving erosion resistance.

- **Development of an innovative rapid response mechanism** to road ruptures and bridge washouts to restore transitivity of affected roads as quickly as possible. This initiative might include the establishment of a fund earmarked for emergency works to reopen roads that have been closed due to climatic events. Administrative procedures would aim to reduce response time and ensure the timely disbursement of funds.

### ***Rationale for PPCR investment***

Ideally, transport infrastructure could be constructed to higher standards to ensure all-season access and reduced vulnerability to climatic effects. Unfortunately, such measures are very costly, at least when faced with the scale of the needs. Even applying low-cost surface solutions to rural roads entails costs of around \$100,000 per kilometre, and the designed solutions are often even higher than that - currently, the indicative costs for rehabilitation and upgrade of roads in Mozambique range from \$500,000 to \$1.2 million per kilometre, even on low-volume rural roads. For this reason, a long-term program of paving rural roads would cost upwards of \$3 billion, far beyond any reasonable projection of the investment budget available for these roads over the next ten years.

Support from the PPCR can be used to identify and pilot approaches that could be scaled up to the national road network level. If these pilots are successful, they could have a major and transformative impact on the way in which limited funds available for rural transport infrastructure are planned, allocated and used in the face of growing climate uncertainty.

This sub-project will therefore develop and pilot a targeted intervention approach by seeking to identify which sections of road and associated structures are most vulnerable to rupture. It will develop appropriate designs for relatively low-cost, and sustainable engineering solutions that will maximize impacts with the limited resources available for rural roads investment. There will be a strong focus on prevention of future ruptures, combined with innovative rapid responses to those places where transitivity has been breached. Currently, this appears to offer the best way to make unpaved rural roads more resilient to climate change and to weather-induced failures.

### ***Institutional arrangements***

The roads sector in Mozambique is considered to be a priority sector. The road sector is managed by a pair of semi-autonomous national institutions that operate under the guidance of the Ministry of Public Works and Housing. The Road Fund is responsible for resource allocation and financial management while the National Roads Administration (ANE) is responsible for implementing maintenance and investment in roads and bridges. Both of these have offices in each province. In addition, Provincial Roads Commissions including private sector and District representation are involved in prioritization of plans. The Road Sector Working Group of G19 donors is chaired by AFDB and works closely with the Roads Fund. These arrangements should help scaling-up and transformational impacts of pilot support. A well-established system of planning, financial and contract control is already in place and therefore there will be no need to create new or parallel institutions.

The Road Fund will be responsible for the financial management of the sub-Project while ANE will be responsible for the engineering and contract management. Specific institutional arrangements will be refined during detailed design.

### ***Gender issues***

While gender issues have not been at the forefront of thinking in the development of the proposals for road sector resilience to climate change, there are clear benefits to communities. Improving year round access to schools will bring benefits for girls' education, improving access to health centres during and after major climatic events, especially important for pregnant women. Road maintenance and upgrading will also generate short-term employment for women through the gender specific targets that the road sector incorporates in all contracts. Women, together with children and certain other groups are the most vulnerable to disasters, including floods. The short and mid-term impacts of floods are manifested in increased malnutrition due to restricted market access, as trade becomes difficult when roads and bridges are destroyed. Similarly, emergency supplies, including food and medication to shelters are often delayed for weeks, creating an environment of food shortages and bad sanitation conditions. This can exacerbate the impacts of malnutrition in women and children.

### ***Expected results***

The opportunity to include dedicated monitoring of this pilot project will mean that lessons learned can be fully evaluated and disseminated to ensure that effective solutions are more widely adopted and conversely, that poorly performing approaches are weeded out. One of the direct results will be improved knowledge in relation to effective solutions.

Durable construction work undertaken on the rural road network will undoubtedly help to reduce the likelihood of failures from climate related events. Further benefits from this work will be gained by the increase in skills resulting from channelling this construction work through domestic contractors. Such contractors will undertake future repair work on the rural road network and hence any development of capacity will be of direct benefit to future responsiveness.

The work on trials for water retaining structures created by road embankments may have significant impact in improving community access to water during periods of drought. Collecting water for household use is predominantly a task undertaken by women.

### ***Indicators and baseline***

Mozambique's classified network of approximately 24,000 kilometres of unpaved roads is particularly susceptible to climate- and weather-induced problems. Floods and heavy rains increasingly cause roads to be ruptured, made impassable, and result in rural populations being cut off from markets and services, with the associated harmful effects on rural income and welfare. Monitoring the frequency and impact of weather related ruptures on the rural road network will allow comparison of project and non-project areas and thus indicate the potential savings from reduced rupture susceptibility and from the reduction in time taken to repair damaged sections. Where the maintenance of reliable access can be achieved there should be a resulting impact on the security and wellbeing of rural communities. Statistics for agricultural marketing may provide indicators of such high level impact.

### ***Risks***

- Failure to properly implement and monitor the sub-Project;
- Poor quality of design and construction work;

- Shortage of quality consultants and contractors;
- Sub-project funding being used as a substitute for normal maintenance activities;
- Failure to adequately monitor and evaluate the additive impact of interventions.
- No perceptible change in weather patterns during the project period;
- Drought rather than flooding during the project period.

## Investment Project 2: Coastal Cities and Climate Change

### **Basic project information:**

|                                     |   |
|-------------------------------------|---|
| Government implementation agencies: | Ministry of State Administration,<br>Municipality of Beira, Municipality of<br>Nacala |
| Responsible MDB:                    | World Bank  |
| Total project cost (\$):            | US\$100 million (IDA) (US\$50 million for climate<br>resilient sub-components)        |
| PPCR request (\$):                  | US\$20 million  |

### **Summary**

This proposed activity will increase the climate resilience of the coastal cities of Beira and Nacala and will generate experience and guidance for building climate resilience into coastal urban planning and development elsewhere in Mozambique - including for the capital, Maputo. The activity will be integrated into the Coastal Cities and Climate Change Project (4CP). The city of Beira is the country's second most populous urban centre and is a key centre of economic activity. The city is also considered to be particularly vulnerable to climate change – through changing rainfall patterns and increasing exposure to cyclones and associated storm damage.

The INGC has predicted that rainfall patterns will become more variable and specific rainfall events more intense. Recent modelling studies, supported by World Bank, indicate that the scale and frequency of future storm surges is likely to increase significantly if sea levels rise. Large parts of the city already flood frequently during periods of heavy rainfall, which combined with high sea tides, have already destroyed parts of the existing coastal protection infrastructure – leaving buildings, infrastructure and much of the city's hinterland vulnerable to flooding and storm damage. It is for this reason that Beira has been selected as a focal site for IDA and PPCR investment.

The city of Beira is also prone to cholera outbreaks. This situation worsens during rainy season and is sharply aggravated during flood events. The endemism to cholera outbreaks reflects a conjunction of four factors: poor sanitation (low rates of use of latrines), surface water tables, poor drainage and unsafe informal settlements.

Thorough analysis has already identified a range of adaptation strategies that include capacity building for integrating climate change into planning and the design of infrastructure, and enhancing resilience of urban infrastructure to control flooding and erosion. These strategies will provide the platform for detailed design of this PPCR sub-project.

### **Development objective(s)**

The development objective is to improve municipal management and sustainable financing approaches to enhance climate resilience in targeted coastal cities.

### **Components and activities**

Specifically the detailed design process will elaborate components and activities. Anticipated sub-components and activities are as follows:

**Component 1 - Strengthening the municipal sector (US\$10 million):** This component will be financed by IDA resources and will strengthen systems and capacities at national and local levels to improve the sustainability of municipal service provision in context of building resilience to tackle debilitating effects of climate-related impacts. At the national level, the component will provide technical assistance and capacity building support to continue development of the national policy and institutional framework for local government and urban management. At the local level, the component will fund training and technical assistance to strengthen municipal capacity for planning, management, service delivery and good governance. This component will also support an overall project coordination unit in *Ministério da Administração Estatal* (MAE), the central ministry responsible for the project implementation.

**Component 2 - Enhancing resilience of strategic coastal cities (US\$50 million):** This component, which will be partly financed by the PPCR, will enhance municipal capacities in selected cities for sustainable resilience to weather-related environmental threats. Beneficiary cities are selected on the basis of their strategic economic importance and their vulnerability to climate related environmental risks: the first and most important cities satisfying these criteria are the regional port cities of Beira and Nacala. PPCR resources will be focussed on enhancing resilience in Beira, and ensuring that experience and lessons are made available to urban planners and governments of other coastal cities.

The component will finance infrastructure improvements to meet existing adaptation deficits and provide the basis for future investments to reduce the threats resulting from climate change. To ensure the effectiveness of these investments, the component will support each municipality's formulation of a comprehensive adaptation strategy, integrated into long-term municipal land use and environmental management plans. In Beira and Nacala these instruments will build on the data, studies, and plans already available or under preparation. Also building on several ongoing initiatives, the component will improve municipal capacities to manage and respond to natural disasters.

Complementary capacity-building activities will support the sustainable operation and maintenance by municipalities of urban infrastructure and services, especially those contributing to enhanced adaptation to climate related environmental risks. Appropriate institutional arrangements for O&M and systems for both service-related cost recovery and general municipal revenue mobilization will be strengthened. Municipal plans and investment strategies will also enhance the cities' economic and revenue bases by promoting the strategic roles of targeted cities in regional development. Municipal counterpart funds contribution will be directed toward recurrent costs for sustainability including environmental planning and management systems and O&M of project financed infrastructure. This will be further discussed during preparation.

Support to Beira municipality will address the adaptation deficit in infrastructure investments to reduce flooding by: **improving the drainage system** (detailed engineering designs for upgrading the existing open-air drainage network as well as subsequent works such as rehabilitating, lining, and widening; **improving coastal protection** - update studies and then develop engineering designs to address beach erosion as well as subsequent coastal works such as rehabilitation of the existing system of groynes, and/or studies and actions plans for improving vegetation on the beach and dunes to further protect against erosion; and further **strengthening the municipal sanitation agency**, including its financial base, to ensure sustainable operation and maintenance for sanitation, drainage, and coastal management. Climate change is expected to alter the intensity, frequency, and total

amounts of rainfall, which aggravates flooding and water logging in Beira and is also expected to increase sea levels that may contribute to more frequent and higher storm surges associated with tropical cyclones and storms. The project will first examine the expected flood damages and develop certain design standards for drainage to reflect the expected climate change impacts.

Support to Nacala municipality will address the adaptation deficit in infrastructure investments to tackle erosion by: developing a **drainage master plan**; executing priority **drainage works**, and strengthening **municipal capacity to maintain the drainage system** and other critical infrastructure and environmental management services.

### ***Rationale for PPCR investment***

The PPCR will assist Mozambique in developing appropriate policies, procedures, guidelines and institutions to address climate change impact in urban areas. The proposed combination of both non-structural and structural measures will greatly enhance the benefits of the project, ensure sustainability of the adaptation investments in infrastructure to control flooding and erosion, and provide a model for the other low-lying coastal cities. The replication of this model will be ensured through dissemination events, including workshops and field visits offered to the stakeholders involved with urban development in Mozambique.

### ***Institutional arrangements***

While the MAE will assume overall coordination, management and reporting responsibilities, implementation of Component 2 activities will be the responsibility of participating municipalities themselves. However, since the participating municipalities may need assistance to adequately develop its capacity at the start of implementation, a coordinating unit at the central government will be set up to support municipalities with fiduciary, safeguard and technical issues. All large procurement, safeguard, and other fiduciary functions will involve the central government entity in charge of project coordination. This assistance to both municipalities would be provided by the same team of experts included in the coordination unit at the national level. The activities proposed under component 1 will be coordinated by the central government with support of the coordination unit mentioned before. Based on capacity assessment to be carried out during project formulation, these arrangements will be specified in detail to ensure their viability.

### ***Gender issues***

Climate changes in Beira will not affect women and men in the same way, and therefore all aspects related to climate change need the inclusion of gender perspective. In addition there are some specific gender attributes that will increase women's vulnerability. In Beira, women and children are more vulnerable to floods that reduce accessibility to schools, safe water, health units, and assistance from older member of the family, and to markets. They are also much more exposed to vector and water borne diseases. Cholera risks have been highlighted above, and malaria has also been responsible for high mortality rates of pregnant women and children under 5 years of age.

Studies have demonstrated that the role of women is decisive in disaster prevention measures. The project will support gender issues taking into account the reality in Beira. It will support reducing flooding in most vulnerable neighbourhoods, where many women are head of the family, and give a leading role to women in early warning systems.



### ***Expected results***

Results will specify following detailed design. These are likely to include:

- Stronger municipal planning at national and city level that is better able to mainstream climate resilience into future urban planning and development.
- Adaptation plans for the coastal cities of Nacala and Beira as a basis for adjusting future urban planning and development
- Upgrading of urban drainage works in Beira to cope with 1 in 50 year return period rainfall events (current design criteria can only cope with 1 in 5 year return period rainfall).
- Renovation and upgrade of Beira's system of groynes to prevent beach erosion.
- Renovation and upgrade of the sea wall to provide protection against high tides and storm surges. The design criteria of the sea wall will be upgraded to provide protection against a storm surge return period event of 1 in 50 compared with the current 1 in 5 year protection provided by existing infrastructure.
- Protection of coastal protection infrastructure through regeneration of 'green infrastructure' – restored dune and mangrove vegetation.
- Detailed proposals for the sustainable financing of investments in climate resilience.

### ***Indicators and baseline***

Current design criteria for Beira's flood and drainage infrastructure is insufficient to cope with extreme rainfall events and storm surges and is currently in poor condition due to under-investment in operations and maintenance and due to damage from flooding and coastal erosion. Beira therefore experiences regular flooding and is highly exposed to cyclones, high tides and storm surges

### ***Risks***

Lack of capacity, investment and recurrent financing are the reasons for the poor current state of Beira's drainage and coastal defences. This project will address this risk through targeted capacity building, by providing additional investment resources (including from the PPCR) and by developing mechanisms for the sustainable financing for the operations and maintenance of such infrastructure.

## Investment Project 3: Transforming the hydro-meteorological services

### *Basic project information*

|                                     |                             |
|-------------------------------------|-----------------------------|
| Government implementation agencies: | IIAM, DNA, INGC, INAM, ARAs |
| Responsible MDB:                    | The World Bank              |
| Total project cost (\$):            | \$15 million                |
| PPCR request (\$):                  | \$10 million                |
| Co-financing (\$):                  | \$5 million                 |

### *Summary*

The building of robust planning and investment frameworks in all economic sectors require reliable hydro-meteorological information and forecasts. Mozambique ranks third amongst the African countries most exposed to risks from weather-related hazards and major floods, cyclones, and droughts have a significant impact on the country's economy. As much as 58 per cent of the population and more than 37 per cent of GDP are at risk from major hazards - with each major shock reducing GDP growth on average by 5.6 per cent – an annual average of 1.1 per cent. The total costs of water related shocks to the economy between 1980 and 2003 are estimated at about US\$1.75 billion. Observed trends and future scenarios suggest climate change will increase the extremity of weather patterns. Building resilience to these shocks enables continued economic growth. The proposed investments aim to provide the necessary tools and information to support climate-resilient and water-enabled economic growth.

### *Development objective(s)*

The development objective of this component is to enhance the National Water Information System to support climate-resilience water-enabled economic growth.

### *Components and activities*

This activity is composed of the following components:

**Diagnostic Analysis and Institutional Coordination.** The existing hydro-climatic network has been established by an array of public and private institutions. There is a lack of coordination between the intervening institutions in the collection of hydro-climatic and water quality, particularly between the National Directorate of Water (DNA), the National Meteorology Institute (INAM), the Agronomic Investigation Institute of Mozambique (IIAM), and the National Institute for Disaster Management (INGC). Private sector entities as well as the Regional Water Administrations (ARAs) also have an important role in the collection of hydro-meteorological data. DNA attempts to centralize the management of the information system and is responsible with the dissemination of information to the interested institutions. This component will: i) conduct an assessment of existing hydro-meteorological data; ii) assess the efficiency and quality of data supplied from the present monitoring structures and of the equipment used for data collection and propose adequate models according to the characteristics of each region; iii) design and quantify the hydro-meteorological networks (this will include data required for flood risk management, drought monitoring, operation of dams, scheduling of irrigation, economic contributions of water to the national development agenda); and iv) define roles, functions, and coordination mechanisms between those institutions responsible for the collection of data.

**Determining the Economic Value of Hydro-meteorological Information.** The value of hydro-meteorological information goes beyond the water sector. Improved weather and

climate forecasts provide crucial information for decision-making in all economic sectors and private agents. In order to assess the economic value of improved weather and climate information and its contribution to better development planning processes, an economic analysis will be conducted to evaluate the impacts of improving the hydro-meteorological and the associated costs and benefits of those services. This assessment will also guide agencies in deciding what investments to undertake to improve services. Such assessment will also inform potential users on the benefits of improved forecasts and the use of the information. Economic information will provide integrated end-to-end-to-end forecasts<sup>45</sup> and warning systems. In such a system, the preferences, needs, and values of users guide decision making throughout the system. Understanding the needs of users will help to prioritize the type of information to generate and how to disseminate that information.

**Pilot Projects in Limpopo and Zambezi.** Under this component, the project will support the design, construction, installation, strengthening and commissioning of a fully integrated hydro-meteorological systems in the two priority basins. This includes: i) procurement and installation of equipment and services for rehabilitation and modernization of hydrometric network; ii) design and implementation of data collection routine; iii) processing and analysis of data; upgrading of the existing manually operated stations and database; iv) design of a fully integrated and comprehensive early warning system including flood monitoring and forecasting, operations of existing and designing potential water resources infrastructure; v) improve modelling capacity for hydrology, weather, and climate; and vi) develop, design, procure, and install decision support tools.

**Capacity Building.** This component will finance capacity building and training activities. The institutional assessments carried out in the sector identify the need for the design and implementation of standardized training programmes for staff on the design, installation, operation and maintenance for the water resources monitoring equipment, facilities and data acquisition methods, management information system and installed hydrological models. It will also finance the design of programs to increase technical capacities to process and interpret information from climate models. This work will also include an integrated capacity building program that ensures improvements in short-term (a few days) forecasts and also on longer-term climate change. Information and training initiatives would also focus on the impacts of weather and climate (on the environment, on socioeconomic infrastructures, on the economic).

### ***Rationale for PPCR investment***

PPCR support would be ***transformational*** in several ways. First, by promoting the institutional coordination between DNA, INAM, IIAM, INGC (this is primarily a reactive organization that uses the information generated by the others). At present INAM is managing the meteorological stations and has several investment plans in formulation and DNA (with the ARAs) manage the information from the hydro-meteorological stations. At present there is no strategic coordination to design a fully integrated system. Second, the PPCR will promote the use of hydro-meteorological information in all planning and strategic frameworks for all economic sectors. There are substantial benefits for economic sectors from the proper use of this information. The PPCR enables cross-sectoral integration and dialogue, a fundamental requirement to ensure that the improved weather and climate forecasting capacities are fully integrated in the planning of all economic sectors. Third, the PPCR will provide the necessary tools to pilot fully integrated hydro-meteorological systems in two Basins. The success of these projects can ensure scalability to a national scale. Fourth,

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<sup>45</sup> This term refers to the comprehensive design of the systems from upstream technical modeling to understanding and characterizing the main end users of information

through the improvement of the services, the strong emphasis on identifying and targeting information to different users, and the implementation of end-to-end-to-end<sup>46</sup> systems, the PPCR ensures the participation of national, regional, local governments, the private sector and stakeholders.

### ***Institutional arrangements***

This project will be implemented in close collaboration with DNA, IIAM, INAM, ARAs and the relevant private sector agencies. Close collaboration with the ARAs for Limpopo and Zambezi is also envisioned. Local governments and other stakeholders will participate actively in the process of developing and implementing early warning systems and in the end-to-end-to-end processes. The improvement in weather and climate information and forecasting will enable all government agencies and private sector in economic sectors to be active users of the improved hydro-meteorological services.

### ***Gender issues***

Women make up a large number of the poor in communities that are highly dependent on local natural resources for their livelihood and are disproportionately vulnerable to and affected by natural hazards. Women's limited access to resources and decision-making processes increases their vulnerability to disasters and climate change. It is important to identify gender-sensitive strategies for responding to increased vulnerabilities and exposure the natural disasters and climate change. Improving hydro-meteorological systems and establishing early warning mechanisms, ensuring strong participatory processes, will improve resilience of these social groups and decrease their exposure to risk.

### ***Expected results***

- Improved capacity of government agencies and private sector to integrate weather and climate resilience information into development plans, programs, and policies
- Institutional coordination mechanism implemented and fully operational
- Enhance information base on weather and climate change risks
- All stakeholders have access to high quality information on climate variability
- Early warning systems on climate crises established and functioning in two basins
- Hydro-meteorological information integrated into development programmes and investment plans.
- Fully functional hydro-meteorological systems in operation in Zambezi and Limpopo

### ***Indicators and baseline***

*Indicator:* Effective institutional arrangement attained

*Baseline:* There is currently no integrated institutional mechanism

*Indicator:* Improved hydro-meteorological information is mainstreamed in the planning of major economic sectors

*Baseline:* Information currently being used primarily in the water sector and in disaster risk reduction

*Indicator:* Fully operational integrated hydro-meteorological system for Zambezi and

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<sup>46</sup> Ibid

Limpopo

*Baseline:* Currently no such system exists

*Indicator:* Increase of accuracy and lead time of medium-range (3-7 day) weather forecast in the two pilot basins

*Baseline:* Accuracy of medium-range forecasts is TBD

*Indicator:* Increase of accuracy and lead time of long-term hydrological forecasts in the two pilot basins

*Baseline:* Accuracy of long-term range forecasts is TBD

*Indicator:* implementation of standardized training programmes for staff on the design, installation, operation and maintenance for the water resources monitoring equipment, facilities and data acquisition methods, management information system and installed hydrological models.

*Baseline:* No standardize training program currently exists

### **Risks**

Potential risks of this project are:

- Lack of interest to further strengthen institutional coordination mechanisms
- Capacity of government agencies to implement the program are limited
- Investments could lead to higher operation and maintenance costs
- Shortage of experts for climate change modelling
- Availability, for climate change modelling, of relevant historical hydro-meteorological data

## **Investment Project 4: Sustainable Land & Water Resources Management**

### ***Basic project information:***

Government implementation agencies: MINAG, ARA Sul  
Responsible MDB: African Development Bank  
Total project cost (\$): USD 39.95 million  
PPCR request (\$): USD 20 million  
Co-financing (\$): USD19.95 million

### ***Summary***

The investment is aimed at promoting climate resilient livelihoods through community-based watershed/ landscape management approaches, thus enabling resource poor communities to reverse their declining land productivity occasioned by climate change and variability. It will also establish a sustainable community-based water-harvesting program in the arid and semi-arid areas of the Gaza Province and enhance crop productivity by combating salt intrusion through various measures.

### ***Development objective(s)***

To strengthen the capacity of communities to address the inter-linked challenges of adverse impacts of climate change, rural poverty, food insecurity and land degradation.

### ***Components and activities***

The PPCR funds will be utilised to finance components 1 and 2 above while the ADF co-financing will fund activities under component 3.

#### **Component 1: Watershed & landscape management.**

This component will undertake regionally focused re-forestation using species that suitably adapt to the climate change impacts. Of particular importance are the indigenous species which are known and would be utilised where deemed feasible. It will also establish nurseries aimed at promoting community forestry activities while at the same time support Agro-forestry activities (of particular economic trees species) to contribute to both food security and household income activities.

Furthermore, adaptation activities including fire controls, potential satellite imagery; Integrated watershed management (including contour bunds, dikes, spillways, erosion control measures such as gully plugs) and improved cooking technologies using less fuel wood will be promoted under this component. To help in enterprise diversification, this component would support the promotion of inland fishing and aquaculture as alternative sources of income and nutrition.

#### **Component 2 Promotion of Water Control Technologies (Harvesting, Storage, Erosion Control and Combating Salt Intrusion)**

This will focus on the promotion of water harvesting and storage infrastructures for agricultural, domestic and livestock use. The location of the infrastructures would be determined and with the participation of beneficiary communities following the development of drainage systems in the Limpopo basin. In addition this component will support the enhancement of the early warning system to enable farmers access climate related information in a timely manner. In order to reduce the adverse effects of salt intrusion that results in land degradation, this component will facilitate the construction of

floodgates and or river breakwater wall to control salt water intrusion

### **Component 3 Rehabilitation of the Water Storage Infrastructure (Massingir Dam)**

This component focuses on the major hydraulic works to maintain regular water supply downstream for irrigation activities. It will involve repair of the Bottom Outlet conduits at the Massingir Dam through the demolition of the concrete around ; Rehabilitation of bottom Outlet Steel liner: Installation into the conduits of new steel liners, Rehabilitation of the two conduits steel liners in the Rehabilitation and Refurbishment of the Bottom Outlet. Hydro-mechanical Equipment: Repairs to radial gates including the alignment and reinforcements of the gates, replacement of hydraulic jacks and provision of hydraulic operating equipment; Refurbishment of the intake gate of the upper conduit; rehabilitation/replacement of downstream gate stop-logs.

#### ***Rationale for PPCR investment***

The Government of Mozambique with support from the AfDB is implementing the Massingir dam Rehabilitation project aimed at repairing the ruptured bottom outlet. The intervention will support the development of over 90,000ha of irrigable land when completed. The PPCR investment will complement this project through adaptation activities that improve the management of the watershed and sustainable land management practices as outlined above. The activities will build the capacity of the local communities to manage their natural resources, ensure the continued productivity of the land and provide alternative livelihoods through aquaculture. They require a change in land management and cultivation practices to adapt to climate variability. The practices can be disseminated to other arid and semi arid areas such as central Mozambique.

#### ***Institutional arrangements***

The Executing agency for the project will be MINAG (National Agriculture Research Institute Southern Zonal Centre) in collaboration with ARA Sul. The existing PIU from the Massingir dam project will have the responsibility over key activities on the early warning system and the development of the drainage system on which they have strategic information and expertise.

#### ***Gender issues***

Over 70% of the targeted population in the development of the irrigable land are women who are often the most vulnerable in cases of flood and drought occurrences given their key role in producing staple foods and crops for household consumption. The women will be targeted mainly under the Watershed & Landscape Management component in establishing nurseries and promoting community forestry activities, and agro-forestry. This will enable them to contribute to both food security and household income activities while also promoting peculiar species of trees, promotion of improved cooking technologies using less fuel wood, promotion of inland fishing and aquaculture (alternative sources of income and nutrition for diversification of livelihoods). Women will also be engaged at the community level in determining the types of intervention most suitable for their locations.

#### ***Expected results***

- Increased productivity and profitability of farm enterprise income through focused adaption of climate resilient technologies
- Increased availability of agricultural and domestic water to improve agricultural productivity and well-being of the beneficiaries

- Reduction in land and soil salinity thereby increasing crop productivity and ultimately production levels

### ***Indicators and baseline***

The irrigated farm sizes should increase from the current average of 0.4ha to 1.5ha as a result of the investment. The amount of land under sustainable management will also increase while the land affected by salt water intrusion will reduce. The amount of land with vegetation cover will increase as well as the number of households using improved cooking technologies.

### ***Risks***

The main risks for sustainable land management practices relate to the successful adoption of the practices by the communities. The implied change in behaviour and maintaining these practices can be mitigated by sensitization exercise and encouraging peer-to-peer knowledge transfer and showing visible gains to communities.



## Investment Project 5: Enhancing Climate Resilient Agricultural Production and Food Security

### *Basic project information:*

|                                     |                          |
|-------------------------------------|--------------------------|
| Government implementation agencies: | MINAG, SETSAN, IIAM      |
| Responsible MDB:                    | African Development Bank |
| Total project cost (\$):            | USD 45 million           |
| PPCR request (\$):                  | USD 20 million           |
| Co-financing ADF12** (\$):          | USD 25 million           |

\*\* This allocation is indicative.

### *Summary*

The investment is aimed at facilitating the diversification of agricultural crops and the promotion of mixed cropping to guarantee against crop failure occasioned by the vagaries of weather. The investment will enable the dissemination, on wider a basis, of climate proven technologies that would improve crop yields. It will also promote efficient utilization of both surface and underground water to boost agricultural productivity. The project will also enhance food security through investment in improvements on-farm storage infrastructures.

### *Development objective(s)*

To improve food security through diversification of agriculture products and the promotion of agricultural technologies to address the critical problems of drought and flood resulting from climate change and variability

### *Components and activities*

The PPCR funds will be utilised to finance components 1 and 2 (below) while the ADF co-financing will fund activities under component 3.

#### **Component 1: Promotion of crop diversification /mixed cropping.**

- Activities to be financed under this component include the production of certified seeds for major crops varieties that are either drought and tolerant. This will be complemented by strengthening seed certification and dissemination processes to ensure that farmers have access to quality seeds. In support of farmers at the local level, *On Farm Adaptive Research (OFAR)* will be supported on popular arable crops like maize, rice, cassava as well as vegetables. Farmer capacities will be strengthened through community awareness and sensitization. Extension services will be supported through the production of extension materials - especially those promoting conservation agriculture in degraded areas and agricultural practices to improve soil and water management

#### **Component 2: Improved infrastructure for irrigation and storage structures for seed and food (seed and food banks)**

- At a farmstead level, the component will assist farmers with small scale irrigation infrastructure through the use of ground water by constructing tube wells and washbores which can be managed by individuals. Support would be provided for famers to ensure reduction of post harvest losses through provision of processing equipment, construction of marketing sheds (including storage facilities) and drying floors.

### **Component 3: Development of large Scale Irrigation Infrastructure Rehabilitation**

- An irrigation scheme already exists (in Xai Xai area) downstream of the Massingir Dam. The Xai Xai scheme if fully developed will help year-round cropping and thus reduce the risk of food insecurity. The focus of this component is the full development of the Xai Xai irrigation scheme by rehabilitating the main canal and construction of the secondary and tertiary canals. It will also support the rehabilitation of the irrigation pumping stations and the construction of a new drainage pump stations.

#### ***Rationale for PPCR investment***

The Government of Mozambique with support from the AfDB is investing in the rehabilitation of irrigation infrastructure in the Limpopo Basin in the Southern Mozambique to provide communities in the vicinity of the schemes with options for food production in periods of drought. The investment needs to be complemented by the diversification of the crops that can be cultivated in the larger land areas traditionally used for rain fed farming. The diversification will improve the resilience of the communities in climate variability and scale up the diversification of agricultural enterprises especially in the promotion of mixed cropping, which is an insurance against crop failure due to variations in weather conditions.

#### ***Institutional arrangements***

The Executing agency for the project will be MINAG (The Authority for Xai-Xai Irrigation Scheme) particularly at provincial level in collaboration with SETSAN and Agriculture Research institute. SETSAN and IIAM will be responsible for the activities related to the crop selection and seed variety improvements.

#### ***Gender issues***

The target populations for the interventions are the smallholder farmers in the Gaza province and women form the preponderance of these.

#### ***Expected results***

- Increased yield of major food staples. Increased water management efficiency, leading to increased crop productivity.
- Increased production of good quality seeds, which are proven to withstand effects of drought and water stress. I
- Increased efficiency in water management leading to increased crop productivity.

#### ***Indicators and baseline***

The percentage of drought tolerant certified seeds grown by farmers increased from 5% to 35%. The number of farmers using certified seeds increased by 20%. Increased yield in major crops. Reduction in difference between farm gate and market prices.

#### ***Risks***

Communities that tend to develop tastes based on the food crops that they grow can potentially resist the diversification of crops. Therefore awareness raising exercises will be important as well as ensuring the market exists for any surplus crops produced by communities. In addition the upstream activities in seed production and certification will need to involve all the stakeholders in the chain to ensure success.

## **Investment Project 6: Developing climate resilience in the agricultural and peri-urban water sectors through provision of credit lines from Mozambican banks<sup>47</sup>.**

### ***Basic project information***

|   |                                   |
|---|-----------------------------------|
| Government implementation agencies:       | To be determined.                 |
| Responsible MDB:                          | International Finance Corporation |
| Private sector partner:                   | To be determined.                 |
| Total project cost (\$):                  | To be determined.                 |
| PPCR request (\$):                        | \$5 million                       |
| IFC co-financing (\$):                    | \$5 million                       |
| Private sector partner co-financing (\$): | >\$10 million (to be confirmed)   |

### ***Summary***

A local Mozambican bank has indicated that it would like to provide a credit line for investments in climate resilience. It has been proposed that these investments focus on improving climate resilience in the agricultural and peri-urban water sectors. Interventions could include for example i) development of irrigation projects that utilize drip irrigation and/or rainwater harvesting; and ii) provision of water to domestic and agricultural users from ground water resource. Such projects could be in the form of informal water supply networks that are currently expanding in many peri-urban environments. These networks are established and maintained by private sector entrepreneurs.

Assessments will be conducted to ensure that water resource use is sustainable and appropriate in terms of socio-economic and environmental impacts. The PPCR funding would be used in conjunction with IFC and the local bank co-financing to develop appropriate businesses that build climate resilience in local communities.

The IFC would provide an advisory service in the form of technical advisors/consultants embedded in the local bank to assist in selecting appropriate investments for building climate resilience. This would assist in raising awareness of the need to build climate resilience across the financial services sector in Mozambique.

This project will ensure that PPCR funds as well as the awareness of climate change risks and opportunities reach a wide range of private sector players, from entrepreneurs to SMEs to large corporate. This is in contrast to other PPCR projects, which are largely restricted to large public or private sector players.

### ***Development objective(s)***

Improve the climate resiliency of agricultural and peri-urban water sectors.

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<sup>47</sup> Project development is at an early stage and the information is preliminary. Further discussions are ongoing with stakeholders and private sector investments.

## **Investment Project 7 (Option a)<sup>48</sup>: Developing climate resilience of rural communities in Niassa Reserve.**

### ***Basic project information***

Government implementation agencies: Department of Parks & National Reserves and Department of Wildlife Development & Community Participation, both housed within the Ministry of Tourism.

|   |                                   |
|---|-----------------------------------|
| Responsible MDB:                          | International Finance Corporation |
| Private sector partner:                   | Carbonex Capital, London, UK      |
| NGO partner:                              | Fauna and Flora International     |
| Total project cost (\$):                  | \$24 million                      |
| PPCR request (\$):                        | \$5 million                       |
| IFC co-financing (\$):                    | \$5 million                       |
| Private sector partner co-financing (\$): | \$14 million                      |

### ***Summary***

The project will develop the climate resilience of rural communities in and around Niassa Reserve in Niassa Province. The area of the project will be approximately 4 million hectares and the reserve is the largest protected area in Mozambique and part of a Transfrontier Park with Tanzania. The project will target communities living in the reserve, the population of which is about 35000.

The main economic activity in this area is slash and burn subsistence farming in nutrient poor soils of the miombo woodlands and local communities are thought to be extremely vulnerable to increasing rainfall variability. Agricultural productivity is very low and the communities are consequently poor and highly vulnerable to climate change.

Several innovative interventions will be financed to develop new income streams and to maintain the rate of natural resource extraction from the miombo woodlands in Niassa Reserve. The interventions will focus on innovative management of the miombo woodlands to diversify livelihood options and build climate resilience. This might include helping to put in place secure land and forest tenure arrangements so that local communities can benefit from forest product use and from future revenues from carbon markets and payments for environmental services and from community-based tourism.

Interventions will include the development of alternative livelihoods for rural farmers and sustainable forest management to maintain/enhance the benefits that local communities presently receive from the miombo woodlands. The financial mechanisms that will ensure that communities benefit directly from the PPCR investments will be developed during the project design. The project will focus on channelling a large percentage of direct benefits to women and youth.

### ***Development objective(s)***

Improve the climate resiliency of poor rural communities in Niassa Reserve and generate innovative techniques for sustainable utilisation of miombo woodlands that can be replicated in other parts of Mozambique.

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<sup>48</sup> Project development is at an early stage and the information is preliminary. Further discussions are ongoing with stakeholders and private sector investments.

### ***Components and activities***

Components and activities will be identified during detailed project design. Indicatively, these will consist of:

- Developing commercially viable businesses based on the utilization of the natural resources of the Niassa Reserve.
- Exploring options for developing private-community partnerships for tourism development.
- Developing an enabling policy environment, including land tenure institutional arrangements, for promoting private sector investment in rural communities of Niassa Reserve, including through carbon management arrangements.

### ***Rationale for PPCR investment***

The primary rationale for the PPCR investment is that the climate resilience of poor rural communities will be developed. This will occur by promoting alternative livelihoods for rural farmers in e.g. tourism, timber processing, reserve maintenance, anti-poaching patrols, carbon stock monitoring. The details of the interventions in different sectors will be developed during the project design phase.

Appropriate management of the miombo woodlands in the face of climate change will form an important component of this project. Fire management, including construction of firebreaks and controlled burning, will for example be used to reduce the frequency of fires in the region and thereby reduce the degradation of the tree component of the woodlands. Climate change effects of increased mean annual temperatures are predicted to increase fire frequency in the region (see INGC Phase 1 study). Fire management is consequently an appropriate adaptation response for local communities to protect their natural capital. The intervention is likely to maintain or increase the flow of goods and services from the miombo woodlands for local communities (e.g. non timber forest products, water flows, carbon sequestration) and thereby builds climate resilience in the communities. With regards to timber, the viability of developing businesses that focus on wood processing and international certification (e.g. FSC) to add value to the raw wood product will be investigated.

The development of new rural livelihoods and investment in the private sector will partly depend on appropriate government policies. Technical advice will consequently include suggested revision of policies, with a particular focus on land tenure and forest asset rights.

## **Investment Project 7 (Option b)<sup>49</sup>: Developing the climate resilience of rural communities in central Mozambique through sustainable timber harvesting.**

### ***Basic project information***

|   |   |
|---|---|
| Government implementation agencies:       | None. Private sector only.  |
| Responsible MDB:                          | International Finance Corporation   |
| Private sector partner:                   | A Mozambican company, and the Global Environment Fund (GEF) based in Washington DC. |
| Total project cost (\$):                  | \$15 million (To be determined).  |
| PPCR request (\$):                        | \$5 million   |
| IFC co-financing (\$):                    | \$5 million   |
| Private sector partner co-financing (\$): | >\$10 million (to be confirmed)   |

### ***Summary***

A private sector forestry company is developing a large-scale, tropical hardwood harvesting operation in central Mozambique. The company is applying for Forest Stewardship Council (FSC) certification that ensures that the operation is conducted in an environmentally appropriate manner. The harvesting within this project will take place in indigenous miombo woodlands, and will have minimal impact on the ecosystem because a very limited number of trees will be extracted per hectare. Furthermore, replanting of indigenous trees will be undertaken. Tree species that are resilient to drought could potentially be selected for replanting as an adaptation to climate change measure.

By maintaining the miombo woodlands and harvesting in a sustainable manner, the company will be promoting resilience of local communities by creating jobs, conserving topsoils, increasing the tourism potential of the region and maintaining watersheds.

Restoration of degraded woodlands could also be a component of the project that generates income via carbon trading. The financial mechanisms that will ensure that communities benefit directly from the PPCR investments will be developed during the project design.

The project will focus on channelling a large percentage of direct benefits to women and youth.

### ***Development objective(s)***

Improve the climate resiliency of poor rural communities and generate innovative techniques for sustainable harvesting of miombo woodlands that can be replicated in other parts of Mozambique.

### ***Components and activities***

To be developed after further consultation with stakeholders.

### ***Rationale for PPCR investment***

Please see summary above. No further details are available at this stage in the project development. Additional information to be added to this template after further consultation with stakeholders.

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<sup>49</sup> Project development is at an early stage and the information is preliminary. Further discussions are ongoing with stakeholders and private sector investments.

Investment thesis: No figures are available at this time. The income will be generated from the sale of tropical hardwood timber. Approximately 70,000 ha are available, with another 200,000 likely to be available later this year.

### ***Risks***

- To be further developed after further consultation with stakeholders.
- The price of tropical hardwood timber may drop too low to sustain the harvesting and replanting operations.
- Timber concessions may not be renewed in the long-term.

## **Investment Project 7 (Option c)<sup>50</sup>: Developing the climate resilience of rural communities through investments to enhance tourism in Gorongosa National Park.**

### ***Basic project information***

|   |                                   |
|---|-----------------------------------|
| Government implementation agencies:       | To be determined.                 |
| Responsible MDB:                          | International Finance Corporation |
| Private sector partner:                   | To be determined.                 |
| Total project cost (\$):                  | \$20 million (to be determined)   |
| PPCR request (\$):                        | \$5 million                       |
| IFC co-financing (\$):                    | \$5 million                       |
| Private sector partner co-financing (\$): | >\$10 million (to be confirmed)   |

### ***Summary***

The private sector and the Mozambican government are restoring Gorongosa National Park. The initiative will include i) development of new tourism private sector ventures, ii) restoration of natural habitat in degraded land to create a wildlife corridor in the buffer zone between the national park and Gorongosa Mountain; and iii) re-introduction of wildlife into the park. The expansion of the tourism industry in the national park will provide jobs for local rural communities and have a multiplier effect in terms of stimulating the local economy and developing alternative livelihoods.

The restoration of ecosystems and conservation of wildlife will also benefit local communities because the tourism potential of the region will increase, jobs will be created, topsoil will be conserved, watersheds will be maintained and forest products will be harvested in a sustainable manner. Local communities will become more resilient to the impacts of climate change (e.g. rising temperatures and an increased frequency of droughts) through this intervention. There is strong government support at both the local and national levels for this project. It is anticipated that income will be generated through tourism operations in the national park and through carbon credits produced from forest restoration. Private sector operators aim to raise \$30 million for the initiative.

Potential government partners: Department of Parks & National Reserves and Department of Wildlife Development & Community Participation, both housed within the Ministry of Tourism. The project will focus on channelling a large percentage of direct benefits to women and youth. The financial mechanisms that will ensure that communities benefit directly from the PPCR investments will be developed during the project design.

### ***Development objective(s)***

Improve the climate resiliency of poor rural communities adjacent to Gorongosa National Park.

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<sup>50</sup> Project development is at an early stage and the information is preliminary. Further discussions are ongoing with stakeholders and private sector investments.



## Policy Lending: Development Policy Operation for Climate Change in Mozambique

### *Basic project information*

|                                     |                |
|-------------------------------------|----------------|
| Government implementation agencies: | MPD (TBC)      |
| Responsible MDB:                    | The World Bank |
| Total project cost (\$):            | \$100 million  |
| PPCR request (\$):                  | \$0million     |
| Co-financing (\$):                  | \$100 million  |

### *Summary*

Development Policy Operations (DPO) provide untied, direct budget support (through loans, credits, or grants) to country governments for policy and institutional reforms aimed at achieving a set of specific development results. Funds are disbursed in one or more stages (tranches). Tranches are released upon a satisfactory assessment of performance against institutional or policy actions or outcome indicators that reflect progress in implementing a country-owned reform program.

To be successful, a DPO requires a strong commitment to policy and institutional reform, a good track record for implementing development programmes and a strong fiduciary framework. DPOs are most commonly used in the context of specific sectors, such as health and education, but they have also been used to support progress in more complex 'cross-sectoral' policy development, including in environment and climate change (e.g. Ghana). Initial discussions between World Bank and the Ministry of Planning and Development (MPD) on possible DPO support to Mozambique have now taken place and IDA 16 funds have been earmarked for this purpose.

### *Development Objective*

It is envisaged that DPO support would complement technical assistance and investment support to be supported by PPCR funding and will also complement efforts to make progress on other aspects of the climate change agenda in Mozambique, including low carbon energy access for the poor and on Reducing Emissions from Degradation and Deforestation (REDD+).

### *Components and Activities*

Preparation of this operation will start later this year and is expected to include, fiduciary assessment, expenditure review of climate-related investment and recurrent expenditure, social and environmental assessment of risks and opportunities; and the identification of appropriate policy actions and triggers for inclusion in the DPO policy matrix.

### *Institutional Arrangements*

The DPO will be prepared by the climate change secretariat as outlined in Figure 13.

### *Expected Results*

Policy actions and triggers have yet to be identified and agreed but these will be designed to support GoM's efforts to:

- **Strengthen its climate change policy framework** – including both adaptation and mitigation aspects
- Strengthen the regulatory and legal frameworks for climate change; and,

- Support the development of an appropriate and effective **institutional framework** for addressing climate change.

DPO funds are usually disbursed in one or more tranches. Under the DPO, tranches would be released when GoM complies with the stipulated policy actions that should then deliver results. Policy actions are usually drawn from existing and emerging policy actions identified by government - to ensure that policy lending provides support for the government's own agenda of policy, institutional and legal/regulatory reform. In the case of Mozambique's climate agenda, they could include (indicatively):

- Preparation and approval by the Prime Minister of a National Climate Change Strategy. This would define national and sector objectives, monitoring measures and expenditure requirements. A national program and plan of action is currently under development and will be reviewed by CONDES.
- Ministerial approval of sector adaptation and mitigation plans (e.g. for the roads, agriculture and health sectors).
- Prime ministerial approval of the National REDD strategy and implementation of pilots (currently under discussions between MINAG and MICOA).
- Start-up of low carbon energy access pilots consistent with the recently-approved National Renewables Strategy.

## PART 3

### REQUEST FOR PROJECT PREPARATION FUNDING

The request for Project Preparation Grants will not be made at this stage. Given that all the projects are co-financed and that the PPG funds are not additional funds, the requests for PPG will be done at a later stage based on project timelines and needs during the implementation of the SPCR.

| <b>Pilot Program for Climate Resilience<br/>Project/Program Preparation Grant Request<sup>51</sup></b>                    |                                 |                             |                          |
|---|---------------------------------|-----------------------------|--------------------------|
| Country/Region:   | Mozambique                      | <b>13. CIF Project ID#:</b> | (Trustee will assign ID) |
| Project Name:   |                                 |                             |                          |
| Tentative Funding Request (in USDmillion total) for Project <sup>52</sup> at the time of SPCR submission (concept stage): | Loan:                           | Grant:                      |                          |
| Preparation Grant Request (in USDmillion):  |                                 |                             | MDB:                     |
| National Project Focal Point:   |                                 |                             |                          |
| National Implementing Agency (project/program):   |                                 |                             |                          |
| MDB PPCR Focal Point and Project/Program Task Team Leader (TTL):  | Headquarters-PPCR Focal Point:  | <i>TTL:</i>                 |                          |
| Description of activities covered by the preparation grant:   |                                 |                             |                          |
| <b>Outputs:</b>   |                                 |                             |                          |
| <b>Deliverable</b>  | <b>Timeline</b>                 |                             |                          |
| (a)   |                                 |                             |                          |
| (b)   |                                 |                             |                          |
| ...   |                                 |                             |                          |
| <b>Budget (indicative):</b>   |                                 |                             |                          |
| <b>Expenditures<sup>53</sup></b>  | <b>Amount (USD) - estimates</b> |                             |                          |
| Consultants   |                                 |                             |                          |
| Equipment   |                                 |                             |                          |
| Workshops/seminars  |                                 |                             |                          |

<sup>51</sup> A separate template needs to be presented for each project and program preparation grant request listed in the SPCR.

<sup>52</sup> Including the preparation grant request.

<sup>53</sup> These expenditure categories may be adjusted during project preparation according to emerging needs.

|   |  |
|---|--|
| Travel/transportation   |  |
| Others (admin costs/operational costs)  |  |
| Contingencies (max. 10%)  |  |
| Total Cost  |  |
| Other contributions:  |  |
| 14. <b>Government</b>   |  |
| 15. <b>MDB</b>  |  |
| 16. <b>Private Sector</b>   |  |
| 17. <b>Others (please specify)</b>  |  |
| <b>Timeframe</b> (tentative)  |  |
| Submission of pre-appraisal document for PPCR Sub-Committee Approval:<br>Expected Board/MDB Management <sup>54</sup> approval date: |  |
| Other Partners involved in project design and implementation <sup>55</sup> :  |  |
| If applicable, explanation for why the grant is MDB executed:   |  |
| <b>Implementation Arrangements</b> (incl. procurement of goods and services):   |  |

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<sup>54</sup> In some cases activities will not require MDB Board approval

<sup>55</sup> Other local, national and international partners expected to be involved in design and implementation of the project.

## Annexes

### Annex 1: PPCR Consultation History

| Event   | Summary   |
|---|---|
| <p><b>Government – Stakeholder Consultation</b></p> <p><b>12/1/2009</b></p> <p><b>First Joint Programming Mission</b></p> | <p>Chaired by MICOA and facilitated by INGC. Participants included National Institute of Meteorology, Ministry of Agriculture, Ministry of Planning and Development, INGC, Ministry of Finance, Ministry of Public Works and Housing, National Directorate of Water. Discussion points:</p> <ul style="list-style-type: none"> <li>• <i>Selection Criteria.</i> Need to establish criteria for selection of activities into sectors, and be guided by science and existing studies and not just by intuition.</li> <li>• <i>Sectors already identified.</i> Four sectors have already been identified by studies as well as the options for response: 1) early warning systems including meteorological information systems; 2) coastal protection in cities and a strategic investment plan for cities in the light of impacts of climate change (Vilankulo, Beira and Maputo identified as the most vulnerable urban areas. Pemba and Nacala are also vulnerable); 3) Agriculture including drought resistant crops, irrigation systems (micro dams), and livestock management due to new pests outbreak in the agriculture sector; 4) River basin management (negotiations erosion control, re-vegetation, bush fire control, river ecosystem restoration) and water supply. Both will require international</li> <li>• <i>Fisheries and health.</i> Coastal ecosystem protection and restoration were not researched by INGC but are probably key to the country’s development. Same for the health sectors.</li> <li>• <i>Institutional Arrangements.</i> The issues of coordination and information management are key to ensure no duplication is made and are still not clear. There is also a question of leadership, of where the decision making lies, of who will eventually lead to decision making. It is suggested to create an overarching institution with capacity to decide at both the political and technical level. Maybe part of the SPCR funds could support this coordination role. Either Ministry of Planning and Development or Ministry of Coordination of Environmental Affairs can do this. The Government should decide.</li> <li>• <i>Funding Strategy.</i> Funds maybe be spent in issues that are funds orphan (coastal protection for instance). Be strategic in terms of what is included in the SPCR proposal and favor areas that are difficult to fund with other sources.</li> </ul> |
| <p><b>Private Sector Consultation</b></p> <p><b>12/2/2009</b></p> <p><b>Maputo</b></p>                                    | <p>Chaired by MICOA and facilitated by INGC and a Joint Mission representative, was attended by participants representing the views of a variety of sectors, including energy infrastructure, transport, agriculture and forestry, mining, oil and gas, and banking, as well as SMEs, represented by Mozambique Private Sector Confederation.</p> <p>The main points and conclusions from the discussion were:</p> <ul style="list-style-type: none"> <li>• Currently there is very little knowledge or awareness on the climate risks and how will these affect the private sector,</li> </ul>   |

|   |   |
|---|---|
|   | <ul style="list-style-type: none"> <li>• The subject of climate risks and relevant economic impacts is new for most of the participants, and it is not possible to make decisions about specific adaptation priorities or activities without the necessary information,</li> <li>• There is a need for analyses on direct and indirect climate impacts addressing specific sectors and from the private sector point of view,</li> <li>• In addition to the information about the impacts, there is a need for specific adaptation options and solutions,</li> <li>• The available and future information, as well as best practice examples, need to be appropriately disseminated. A few participants expressed the need for capacity building.</li> <li>• There is a need to understand impacts on key infrastructure sectors</li> <li>• There is an evident need for a sectorally oriented approach,</li> <li>• There is a need for appropriate policies and regulations (e.g. building codes, zoning) that address climate change and resilience,</li> <li>• There is a need for appropriate incentives (e.g. tax incentives) that would spur implementing adaptation initiatives,</li> <li>• There is a need to develop appropriate insurance products that would address climate change and incentivize appropriate adaptation changes.</li> </ul> |
| <p><b>Minutes Donor Community Consultation</b></p> <p><b>2/12/09</b></p> <p><b>Maputo</b></p> | <p>Chaired by MICOA and Joint Mission representatives, was attended by participants from the: Norway, Sweden, Denmark, AFD, DFID, Japan, FAO, WFP, IFC, AfDB and UNDP. The main points and conclusions from the discussion were:</p> <ul style="list-style-type: none"> <li>• Coordination with the INGC Phase II Proposal. Most of what is listed under SPCR Phase I corresponds to INGC Phase II. Some donors are financing INGC Phase II (UNDP, Denmark, France potentially). INGC II includes donor coordination, the challenge now would be to ensure SPCR is in line with INGC II that is actually led by INGC and MICOA jointly.</li> <li>• <i>Food security and Communities.</i> The impact of climate change on food security is still not sufficiently analysed and prioritized in policies. The impacts at community level also need to be addressed.</li> <li>• <i>Pilot areas.</i> Idea of concentrating on a geographical scope of those sectoral priorities identified.</li> <li>• <i>Coordination with REDD.</i> Forestry is a strategic sector for the future of Mozambique, and is already in the making. REDD and SPCR should work together.</li> <li>• <i>Additional Funding.</i> Bilaterals are also getting funds for adaptation and it would make sense to supplement necessary funds in Moz and align them with SPCR.</li> </ul>  |
| <p><b>Civil Society Consultation (CSO)</b></p>  | <ul style="list-style-type: none"> <li>• What can be the cost &amp; benefit to be involved with climate change?</li> <li>• To ensure community involvement with the SPCR, there is a need for</li> </ul>  |

|   |   |
|---|---|
| <p><b>8/12/09</b></p> <p><b>Maputo</b></p>  | <p>capacity building within the CSOs working at a local level. Most notably with issues involving land rights (clarify the meaning of community land)</p> <ul style="list-style-type: none"> <li>• Part of CSO representation would like involvement with the regulation process.</li> <li>• On Climate Change (SPCR), the team was recommended to have approach on different focus, not only on Disasters, but also on Natural Resources, Sustainable Development, etc</li> <li>• On government side, CSOs detected a lack in coordination among the GoM, for examples: the role of MICOA, INGC, etc.</li> <li>• It's also came clear for the team, the CSO in Mozambique, are not well organized in way to help in the SPCR process.</li> <li>• For the mission planned in March 2010, the invitation should be sent in advance using the CSO list of those who attended the December mission meeting. CSOs will distribute the invite among themselves.</li> </ul>   |
| <p><b>Consultations during the second joint mission</b></p> <p><b>5-20/4/2010</b></p> | <ul style="list-style-type: none"> <li>• <i>Ministry of Planning and Development (MPD) and MICOA.</i> The mission had meetings with Adriano Ubisse and Orlando Z. Mazive (MPD) and Rogario Wamusse (MICOA) to provide an update of the SPCR preparatory phase to facilitate the finalization of the phase I proposal. The mission reiterated that the Government will need to submit the SPCR phase I proposal to the subcommittee as soon as possible to ensure the fast tracking of the completion of the phase I. The preliminary investment options for phase II as outlined during the previous mission were discussed and Government indicated that they will lead the process and take full ownership of the investment plan. MPD indicated that an urban poverty strategy is under preparation and the investments there in could possibly be considered for the SPCR phase II.</li> <li>• <i>Institute of Agrarian Research (IIAM).</i> The mission met with Calisto Bias, Manuel Amane and Thomas Agulo. A new strategic plan for IIAM is currently under development and will be approved in June. IIAM has undertaken substantial research on short cycle varieties of certain crops. In the Limpopo Basin the Institute has been involved in two main projects addressing issues of dry land agriculture and water productivity. The Institute is in need of capacity building linked to modeling of crops under various climatic conditions and also meteorological data collection.</li> <li>• <i>Ministry of Agriculture (MINAG-DNEA, DNAS).</i> The mission held meetings with Daniel Clemente, Inacio T. Nhancale and Aurelio Nhabetse. An agriculture strategy is under conceptualization linking agriculture programs with planned activities upto 2014. This builds on the 2008 Food Production Action Plan that identified the main areas of interventions as well as the need for improved seed varieties and quality. Disease control in livestock is also a priority particularly at border areas. The DNEA emphasized the need for the development of the private sector in agriculture. The Department is making efforts to promote conservation agriculture to improve yields and soil</li> </ul> |

conservation. However further training of the extension workers and farmers is required coupled with demonstration plots. DNAS elaborated on the irrigation investment plan drawn up in the early 1990s exists providing a strategy for expansion of irrigation facilities. Land cover maps also exist though currently the scale is 1:250,000. A recommendation was made to invest in more detailed maps at a scale of 1:50,000 that would be more applicable in local planning and investment.

- *National Roads Authority (ANE)*. The mission met with Elias Paulo who provided an overview of the road investment priorities and maintenance strategy. The national roads network is maintained by ANE while the maintenance of unclassified roads is the responsibility of Districts. An annual budget is provided for the maintenance of the road network however at the District level this usually covers spot improvements. In flood prone areas the strategy is to potentially elevate roads and increase the number of culverts. The ongoing study being undertaken by COWI will provide further detail in the economics of adaptation to climate change in the road sector.
- *German Technical Cooperation (GTZ)*. The mission met with Wibke Thies who conveyed some of the key interventions by GTZ linked to areas of community forestry management and conservation agriculture. GTZ is considering participation in the SPCR in Mozambique. In the Limpopo basin reference was made to an FAO project in agroforestry that the SPCR phase II could potentially build on. Lessons learnt from GTZ's work in the Limpopo National park buffer zone as well as trials to up-scale conservation agriculture can inform the decision making in the potential interventions in the Limpopo Basin under the SPCR phase II.

**Intra-government, donor and civil society consultation, hosted by CONDES and the Environment Working Group.**

**25/5/2011**

**Maputo**

Chaired by the Vice Minister of MICOA, Ms. Ana Paulo Chichava. Approximately 30 participants, including members of CT CONDES (National ministries and authorities, civil society), donors (i.e. UNDP, DFID, World Bank, AFD, Sweden, AfDB). MPD and MICOA had jointly prepared a presentation of the SPCR, which was presented by the recently appointed PPCR Coordinator in MPD, Mr. Xavier Chavana and the PPCR Coordinator in MICOA, Ms. Guilhermina Amurane. The main comments raised by the participants included:

- **Strategic Environmental and Social Assessment (SEA)**. How will the SEA planned for the PPCR Phase I be coordinated with the ongoing coastal SEA being led by MICOA. It was clarified that the PPCR SEA will focus on the geographic and sector areas of intervention of the SPCR.
- **Selection Criteria of the proposed SPCR interventions**. Further information was requested on the criteria used to select the proposed SPCR interventions. The response was that the priorities are derived from existing studies and documents, including the National Action Plan for Adaptation (NAPA), INGC Phase I and II studies.
- **Pilot**. Will all the SPCR interventions be of pilot nature. The response was that yes, they are all expected to be transformational and demonstrative in nature.
- **Resilience**. The concept of climate change resilience should be further



explained in the document, including how each of the proposed projects tackles the issue. In my opinion, this is clearly spelled out, but perhaps the presentation could have benefited from more background (data on climate risks in Mozambique, maps etc). This should be included in the Cape Town presentation.

- **Knowledge generation, education, awareness raising.** It was recommended that further emphasis be made on knowledge generation, education, awareness raising, in close collaboration with existing initiatives (ie Africa Adapatation Program, INGC Phase II project).The participants were informed that the SPCR will have a specific component in that regard.
- **When are SPCR projects expected to start?** The response given was that although Phase I activities (TA, studies) will start in 2011, it is not likely that the investments will start until 2012.
- **Inter-institutional coordination/coordination of donor-funded initiatives.** Coordination mechanisms need strengthening. Although this issue is spelled out in the draft SPCR document, further emphasis was requested to clarify these aspects. CONDES is expected to play a key strategic role.
- **Involvement of civil society.** Several civil society representatives wanted to know how civil society can further collaborate in the preparation and implementation of the SPCR. The response was that existing civil society platforms (ie. G20) will be used at the national and local levels for the purpose of consultations. During implementation, each project (i.e. agriculture in the Limpopo Basin through AfDB) will need to spell out specific measures to ensure civil society participation.
- **Gender.** Although this was not raised in the plenary, several participants requested that the document further elaborate on gender mainstreaming (NB – the consultation was undertaken on an earlier draft and gender aspects and implications have now been addressed in more detail).
- **Overall,** the consultation was positive and was an important milestone in the process leading to the finalization of the SPCR document. It was emphasized that there will be more opportunities for consultation, including once the Strategic Environmental and Social Assessment starts. During the week of May 30 MPD and MICOA will be carrying out consultations in Xai Xai and Beira. A peer review is also being contracted for the week of May 30. It is expected that the Government will be able to submit the document in time for Cape Town and the Vice-Minister of MICOA is expected to make the presentation.

## Annex 2: Summary of the SPCR Consultation Process

| Location          | Profile of the participants   | Key issues raised   | No of participants <sup>56</sup> |
|-------------------|---|---|----------------------------------|
| Central Level     | <p>Technical CONDES (Central Government)</p> <p>International Development Partners</p> <p>Civil Society</p> <p>Academia</p>   | <p>The need to insure the participation of CSO in the implementation of SPCR projects</p> <p>The need to establish a common understanding of the concepts of climate change adaptation and resilience among all stakeholders</p> <p>Integration of academia and research institutions in knowledge development and knowledge management programs</p> <p>Enhancement of coordination of several ongoing climate change adaptation programs and projects</p> <p>Clarification of nature of climate risks that justify the implementation of forestry resilience projects in the Niassa Reserve, Northern Mozambique</p>   | 30                               |
| Limpopo watershed | <p>Members of Provincial and District Governments</p> <p>Representatives of Provincial and district Civil Society</p> <p>Representatives of relevant public irrigation and water management infrastructures</p> | <p>The need for mobilization of more funding mechanism for Climate change adaptation actions</p> <p>Mobilization of funding for the construction of the Mapai dam to increase water storage capacity and flood protection in to investments in the Lower Limpopo River.</p> <p>Rethink the possibility for water transfer from the Limpopo River to develop arid lands in the interior districts</p> <p>More coordination and synergies among several ongoing interventions on climate change adaption in the Limpopo watershed</p> <p>Use of innovative credit schemes for agricultural production to reduce the cost of loans due to high interest rates from commercial banks. The experience of GAPI has been recommended.</p> <p>Integration of all the chain of agriculture production in credit to agriculture, including land preparation and training of farmers</p> | 72                               |

<sup>56</sup> The list of participants in each meeting is attached to this summary

|                       |   |   |    |
|-----------------------|---|---|----|
|                       |   | <p>Full alignment of investment into one program to tackle the main problems and needs</p> <p>Establishment of a comprehensive national policy for Climate Change adaptation</p> <p>Introduction of use of gas from Pande, Inhambane for domestic and industrial purposes in Maputo and Matola City to reduce pressure on the forestry resources for coal and firewood production in the Limpopo watershed</p>  |    |
| Zambezi Valley        | Members of the Government of Sofala Province  | <p>Definition of criteria for budget allocation for climate resilient roads among the provinces and districts along the Zambezi Valley</p> <p>Establishment of attractive interest rates for private sector loans (forestry) than those offered by commercial banks.</p> <p>Integration of information of the existing database in the National Directorate for Waters (DNA) during the determination of needs for the establishment or rehabilitation of the hydro-meteorological gauge stations</p> | 7  |
| Municipality of Beira | <p>Members of Municipal Council</p> <p>Members of the Municipal Assembly</p> <p>Representatives of local Civil Society</p> <p>Representatives of local Private sector</p> | <p>Transparency and accountability in resources disbursement from central to local level</p> <p>Coordination with different stakeholders (donors and ministries) to avoid duplication of efforts at local level</p> <p>Synergies with other ongoing initiatives for coastal (dredging) protection and dunes restoration</p>   | 20 |

### Annex 3: List of Participants - SPCR Consultation Process

List of participants in the SPCR consultation process:

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**List of participants in the SPCR consultation process:  
Municipality of Beira (Beira, 01/06/2011)**

|    | Name                        | Institution                               |
|----|-----------------------------|---|
| 1  | Daviz Simango               | Presidente do Municipio ( <b>Mayor</b> )  |
| 2  | Borges Gada Cassucussa      | CMB Vereador dos Transportes              |
| 3  | Maria Dulce Pereira Carrelo | Vereadora de Agro- Pecuária               |
| 4  | Vitoria Amosse Machava      | Vereadora de Saúde e Acção Social         |
| 5  | Samuel Mateus               | Vereador dos Transportes                  |
| 6  | Jaime Artur Tomo            | Vereador de Educação e Cultura            |
| 7  | Jeremias Liando             | Vereador de Gestão Urbana e Ambiente      |
| 8  | Simao Bila                  | Associação Maes intercessoras             |
| 9  | Augusto de Jesus Passi      | Protecção Costeira                        |
| 10 | Franase Maji                | Vereador de Finanças                      |
| 11 | Augusto Manhoca             | CMB SASB                                  |
| 12 | Gabriel oliveira            | Conselho Empresarial de Sofala            |
| 13 | Prakash Prehlab             | Associação dos Comerciantes da Beira      |
| 14 | Albano Carige António       | Vereador de Construção                    |
| 15 | Mussa Esmail Ahmad          | Associação Muçulmana de Sofala            |
| 16 | António dos Anjos Luis      | Universidade Católica de Moçambique – GIS |

## Annex 4: DRAFT External Review Report & Comments

Please note the below is draft report of the External Review conducted on the SPCR. This draft is subject to further review, updates and discussion with the government and MDBs.

### **Draft Review of the Government of Mozambique's Strategic Program for Climate Change Resilience**

**Title of the investment plan:** Mozambique Strategic Program for Climate Resilience

**Program under the SCF:** Pilot Program for Climate Resilience

**Name of the reviewer:** Camille Bann

**Date of submission:** 9 June 2011 (*draft only*)

#### **Part I: General criteria**

This section comments on whether Mozambique's Strategic Program for Climate Resilience (SPCR) complies with the general criteria indicated in Annex A of the "Proposal for the preparation of independent technical reviews of Strategic Climate Fund (SCF) investment plans and programs".

#### ***Does the SPCR comply with the principles, objectives and criteria of the relevant program as specified in the design documents and programming modalities?***

Mozambique's SPCR does comply with the Pilot Program on Climate Resilience (PPCR) program principles, objectives and criteria<sup>57</sup>. Mozambique is one of the poorest countries in the world and extremely vulnerable to climate change. Its SPCR is designed to achieve the high level objective of *mainstreaming* climate resilience into development through three complementary components (referred to as 'pillars' of the SPCR in the investment plan) - program management and technical assistance<sup>58</sup>, pilot investments and institutional and policy reform.

The proposed pilot investments cover four key sectors - agriculture, transport (rural roads), urban (coastal cities) and natural resources (watershed management and forestry). The program encourages private investment in climate resilience in agriculture and forestry through the provision of credit from Mozambican banks. While the program's breadth and diversity means that a number of important climate risks and impacts will be addressed and a range of key government departments/ministries will be brought into the process care must be taken to ensure sufficient resources, expertise and data /scientific evidence are available to successfully deliver across the *program*.

*Note: I am wondering if the programme is too ambitious? The PPCR Programming and Financing Modalities states 'range of investments should be focused on one to three sectors or themes, or could be focused on a key sub-region of the country..... Focus of activities on a limited number of priority actions will lead to higher impact and measurable shifts'*

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<sup>57</sup> These are set out in 'PPCR Programming and Financing Modalities' Climate Investment Funds, April 2009

<sup>58</sup> Program management and technical assistance covers management and co-ordination, monitoring and evaluation, monitoring frameworks, knowledge management, evidence building and capacity building.



The program is country led having been developed by the Government of Mozambique following two and a half years of stakeholder consultation (see Annex 1 of the SPCR). It has been designed within the broader context of sustainable development and poverty reduction in mind, and builds on existing work, in particular the National Institute of Disaster Management (INGC) Phase 1 study, the National Action Program for Adaptation (NAPA) and the World Bank's study on the economics of climate change.

***Does the plan take into account the country capacity to implement the plan?***

Capacity building activities are included under the program management and technical assistance pillar of the SPCR. The SPCR states that capacity building will focus on one productive sector (e.g. agriculture), one social sector (e.g. health) and provinces of the Limpopo and Zambezi valleys. The capacity building requirements will be developed in detail in Phase 2. The SPCR intends to complement and support other projects and programs that include capacity-building components such as initiatives undertaken by the Ministry of Coordination of Environmental Affairs (MICOA) and supported by the Africa Adaptation Program (AAP) and the Department of International Development (DFID). Capacity building is to be incorporated into all technical assistance and investment sub-components. Some detail is provided for project 2, where it is proposed to set up a coordinating unit within central government to support and build the capacity of municipalities, who will be responsible for component 2 of this project, with respect to fiduciary, safeguard and technical issues. However the SPCR does not present an overview/scoping of the capacity gaps and priority needs.

***Is the plan developed on the basis of sound technical assessments?***

The plan is based on the best available information, but acknowledges that there are gaps and uncertainties in the current evidence base. Technical assistance support will address key sectors and issues where further evidence is needed to identify adaptation options and investment needs. Ongoing Phase 1 activities include (SPCR, para 46): a Strategic Environmental and Social Assessment (SESA) of the proposed SPCR investment portfolio to identify measures to minimize environmental risks and to identify opportunities for environmental enhancement; (ii) an assessment of climate-resilient livelihood options in drought prone areas in the Limpopo valley (to inform detailed design of adaptation investments); (ii) studies of private sector adaptation investment options for ports, tourism, forestry and urban water supply; (iv) support for PPCR coordinators in the Ministry of Planning and Development (MPD) and MICOA; and, (v) a national assessment of the impacts of sea level rise and storms on coastal resources to provide a solid analytical platform for climate resilient policy development and planning in the coastal zone.

*Note: I am wondering if the programme is too ambitious? The PPCR Programming and Financing Modalities states 'range of investments should be focused on one to three sectors or themes, or could be focused on a key sub-region of the country..... Focus of activities on a limited number of priority actions will lead to higher impact and measurable shifts'*

In Phase 2 additional studies will also be undertaken of impacts and adaption options in the health sector and on exploring options for addressing climate resilience in social protection policy. For investment project 7, scientific studies will be needed to understand the ecosystem services provided by forests and generate the biophysical data that underpins the development of Payments for Ecosystem services (PES) and Reducing Emissions from Degradation and Deforestation (REDD) mechanisms. It is assumed that this will be

considered in the further design of these projects.

*Note: Is this covered under the technical Assistance budget in Phase 2?*

*How would the results of these studies affect the proposed portfolio of investments? Would they provide the basis for other organisations / funders supporting activities in these key sectors?*

***Does the plan demonstrate how it will initiate a transformative impact?***

It is anticipated that the plan will play a catalytic role in promoting climate-resilient growth strategies by scaling up the pilot investments, which are focused in priority areas and sectors, and by providing the flexibility to develop and explore new approaches, which is not currently a focus of other donor funding.

A number of the pilot projects describe how they could be transformational – for example, the identification of low cost and sustainable engineering solutions for improving the climate resilience of rural roads could have a transformative impact on the way in which limited funds are utilized. For pilot project 3 PPCR support would be *transformational* by promoting the institutional coordination between the National Water Department (DNA), the National Meteorological Institute (INAM), the Agronomic Investigation Institute of Mozambique (IIAM) and INGC, promoting the use of hydro-meteorological information in planning and strategic frameworks across economic sectors, and piloting integrated hydro-meteorological systems in two basins that can then be adopted at a national scale. It is understood that further evidence of how the investment plan will initiate a transformative impact will be provided in the final version of the SPCR.

***Does the plan provide for prioritization of investments, stakeholder consultation and engagement, adequate capturing and dissemination of lessons learned, and monitoring and evaluation and links to the results framework?***

- The prioritization of investments is discussed in Section II.

The development of the SPCR has involved an extensive **stakeholder consultation and engagement** process (see Annex 1 of SPCR). Further internal government reviews and consultations with international development partners and civil society groups are planned for Phase 2 of SPCR, including detailed consultations on the geographical focal areas selected for support.

Knowledge management is a sub-component under the SPCR's program management and technical assistance pillar and will include the detailed design and implementation of measures to disseminate, discuss and mainstream relevant studies and pilot experience on climate adaptation. This will include exploring the role national knowledge-sharing mechanisms and institutions can play in the process such as the Climate and Disaster Risk Management Research Center (CICLAR) (a venture between the University of Eduardo Mondlane (UEM) and INGC) and linkages with global knowledge mechanisms and networks, such as the Africa Adaptation Program and the DFID-supported Climate Development Knowledge Network (CDKN). Mechanisms and budgets will be identified to ensure that analytical products, lessons and experience are shared across national and international partners. The importance of regional dissemination is noted, particularly within the Southern African Development Community (SADC), given the trans-boundary nature of water and natural resource management issue.

*Note: I am assuming that this level of detail is sufficient at this stage? 'Each component of the country's SPCR will be requested to include, and budget for, knowledge management and learning activities...Creative ways of both capturing as well as disseminating lessons learned and relevant knowledge products should be piloted' CIF April 2009*

- **Monitoring and evaluation framework** for the SPCR portfolio will be developed in Phase 2. The current draft does not include a results framework, however key results are presented in the summary section along with success indicators.
- **Does the plan adequately address social and environmental issues including gender?**
- **Social issue** are referred to throughout the plan. For example, the plan highlights the importance of road infrastructure for health and education, agriculture productivity for health and livelihoods, and the management of natural resources for livelihoods (through the maintenance of natural capital that underpins economically productive process and presents new funding opportunities). The SPCR discusses the relationship between environmental factors, climate and children's health.

During the SPCR consultation process a number of stakeholders emphasized the need to strengthen **gender issues** and gender is now well covered in the plan. The impact on women has been taken into consideration in the design of all the proposed investment projects. For example, climate resilient roads will facilitate access to health centers during and after major climatic events, which is especially important for pregnant women. In agriculture, women primarily grow crops for household food security and thus are the main targets of projects building resilience in this sector. Furthermore, in 2010 the Government of Mozambique approved the Gender, Environment and Climate Change Strategy and Action Plan thus demonstrating a strong commitment to gender issues on which the SPCR can build.

In terms of **environmental issues** the SPCR states that the impact of climate change on natural resource has not yet been assessed. However, in recognition of the links between well managed natural resources, sustainable development and (cost-effective) climate resilience opportunities a number of pilot projects have an environmental focus. For example Project 4 is aimed at promoting climate resilient livelihoods through community-based watershed/landscape management approaches. In addition the SPCR presents three options under project 7 related to natural resource management. Project 7a aims to develop climate resilience of rural communities in Niassa Reserve possibly through the development of land tenure arrangements so that local communities can benefit from forest product use and from potential revenues from carbon markets, PES and community-based tourism. Project 7b aims to promote sustainable timber harvesting within indigenous miombo woodlands in Central Mozambique. Local livelihoods will be enhanced through job creation, management of watersheds and soils, tourism development and potential carbon trading opportunities. Project 7c aims to enhance tourism in Gorongosa National Park thereby providing jobs for local rural communities and stimulating the local economy. Carbon credits produced from forest restoration are another potential source of income.

*Note: Presumably only one of these projects will be funded under the program. Could the SPCR detail the next steps for prioritising which option will be funded?*

**Does the SPCR support new investments or funding in additional to on-going/planned MDB investments?**

The requested PPCR amount is US\$100 million, and is associated with co-financing totaling to US\$250 million. In most cases, proposed investments have been designed to blend with existing or pipeline investments of the World Bank and African Development Bank (AFDB). This will enable PPCR funds to 'mainstream' climate change into larger investment projects, thus achieving impacts at scale and reduce overall transaction costs during processing and implementation and thus cost effective implementation.

***Does the SPCR take into account institutional arrangements and coordination?***

The SPCR states that the Government of Mozambique (GoM) currently lacks many of the components of a national institutional framework necessary for developing effective national and sectoral policies and plans for addressing climate change. There is no nationally agreed, cross-sectoral climate change strategy and legal provisions for addressing climate change are at an early stage of development. Responsibilities across government departments on climate change planning and policy are not well defined and legal and regulatory provisions are fragmented. Discussions on institutional arrangements for addressing climate change are ongoing within government and considerable additional investment is deemed necessary to build effective sector plans, technical skills and implementation capacity.

The SPCR recognizes the importance of institutional strengthening and to support efforts to put in place an effective institutional framework for climate change a Development Policy Operation (DPO) is proposed. A series of two DPOs for US\$50 million each is envisaged over 4 years. These operations would support, for example, the development of a national climate change strategy, national institutional framework and sectoral strategies and action plans. DPO-supported policy reforms will complement the portfolio of sub-project investments financed by the PPCR and will help the scaling-up of successful approaches to national level. Technical assistance and perhaps other development partners will support the proposed operation.

The SPCR recognises the need to ensure that support for climate resilient planning is targeted appropriately at district and local levels in line with Mozambique's 'decentralization' and 'de-concentration' process, whereby responsibilities will be increasingly delegated to district and municipal authorities.

It is envisioned that eventually a high level steering committee will be required to ensure that policy development is coordinated across government and that appropriate plans, budget allocations, implementation and reporting arrangements are put in place. The SPCR outlines the current arrangements and a possible future institutional framework (see Section 6 of the SPCR)

***Does the SPCR promote poverty reduction?***

More than 50 per cent of Mozambique's population lives below the absolute poverty level and the incidence of rural poverty is particularly high. Many rural households are dependent on subsistence agriculture and around one third of Mozambique population is food insecure. Agriculture is also a major contributor to the economy and employer. In addition rural households are vulnerable to natural disasters. Therefore actions in rural areas targeted at improving the resilience of agriculture to climate change should promote poverty reduction. These issues are addressed in a number of the pilot projects. The lack of

infrastructure also contributes to high poverty rates. Improving the country's road system will help ensure access of rural communities to health and education services and markets (pilot project 1). The SPCR also aims to strengthen environmental management to support sustainable rural livelihoods.

***Does the SPCR consider the cost effectiveness of investments?***

There is little analysis of the cost effectiveness of the pilot investments. The costings are at this stage indicative (this is consistent with the PPCR programming and financing modalities which state costing should be 'notional'). The lack of specific costing for the investments makes a detailed cost-effective analysis difficult at this stage.

*Note: Would this be considered further in Phase 2? I am not clear what level of economic / cost effective analysis is appropriate at this stage? Presumably the specific activities under each project will be specified in more detail and costed, in Phase 2?*

- However, some high level economic analysis is provided. For example, the SPCR states that the proposed investment to improve the climate resilience of Mozambique's roads will be cost-effective. It is estimated that a long-term program of paving rural roads would cost upwards of US\$3 billion, while support from the PPCR can be used to identify and pilot sustainable low-cost engineering solutions.

**Part II: Compliance with the investment criteria or business model of the PPCR program.**

***Climate risk assessment: Has the SPCR been developed on the basis of available information on the assessment of the key climate impacts in the country; the vulnerabilities in all relevant sectors, populations and ecosystems; and the economic, social and ecological implications of climate change impacts?***

68. The SPCR draws together the available projections of climate change and their impact on different economic sectors and segments of the population. While there is much uncertainty, based on available information increasing climate and weather variability is likely. Rainfall is suspected to be extremely variable in the future and an increase in the frequency of extreme weather events such as floods and drought is anticipated. An analysis of Maputo's (incomplete) sea level record indicates a rise of 2.17mm/year - plus or minus 0.76mm. Any sea level rise is likely to have negative implications for low-lying areas where 60 per cent of Mozambique's population lives. The World Bank modelled the impact of four International Panel for Climate Change (IPCC) scenarios and estimated that Gross Domestic Product (GDP) would fall between 4% and 14%, relative to the baseline in 2040-50, if adaptation strategies are not implemented.

Mozambique is the third ranked African country in terms of exposure to risks from weather-related hazards (drought, floods and tropical cyclones). The human and economy impact of weather-related hazards is well documented in the SPCR. The INGC synthesis report warns that "the exposure of Mozambique to natural disaster risk will increase significantly over the coming 20 years and beyond, as a result of climate change". Subsequent analysis undertaken by the World Bank show that rain-fed agriculture, coastal towns and transport infrastructure are sectors that are particularly vulnerable climate change. However, the impacts of climate change on several sectors have not yet been assessed adequately – including the health sector and on natural resources (e.g., fisheries and forests). Mozambique is amongst the 10 nations most affected by malaria. Warmer temperatures and an increase in flood events are likely to increase the incidence of malaria, while

droughts are often associated with water-borne diseases, including cholera. The high dependence of Mozambique on shared water resources is an important factor - upstream rainfall reductions in Zimbabwe and Zambia could translate into significant reductions in river flows in Mozambique. Further work is needed to elaborate the potential impact of climate change on water resources.

***Institutions/ co-ordination: Does the SPCR specify the coordination arrangements to address climate change: cross-sectoral; between levels of government; and including other relevant actors (e.g., private sector, civil society, academia, donors, etc).***

It is proposed that Phase 2 of the program is managed by a national level Program Coordination Unit, co-hosted by MPD and MICOA and supervised by the World Bank. MPD will help ensure that knowledge and learning from pilot investments and studies are shared and mainstreamed into the planning of sector line ministries, provinces and districts. MICOA will help ensure that activities support a planned national climate change program and are coordinated with other climate-related international donor support initiatives. It is anticipated that the unit will also be responsible for coordinating with the planned DPO support.

The private sector is involved in a number of the pilot projects and the UEM is expected to play a part in knowledge dissemination. Consistent with the recommendations of stakeholder consultations – a participatory and consultative processes will continue as part of the SESA process and subsequently as part of detailed project design of investment projects.

*Note: Will there be any other mechanism through which private sector, civil society, academia or donors will be involved? e.g., steering groups...*

***Prioritization: Has the SPCR adequately prioritized activities taking into account relevant climate/risks and vulnerabilities and development priorities, sectoral policies; ongoing policy reform processes and existing, relevant activities and strategies.***

The pilot projects have been selected based on existing evidence of the sectors most vulnerable to climate change. The National Adaptation Program of Action (NAPA) identifies four priority areas – strengthening early warning systems, strengthening the capacity of farmers to deal with climate change, reductions of the impacts of climate change along the coastal zone, water resources management. The World Bank study identified roads, agriculture and coastal infrastructure as priority sectors for support. As mentioned above, this study did not cover natural assets (such as fisheries and forests), health or urban issues. The Institute of Disaster Management (INGC) Phase I study focused on a substantial subset of Mozambique’s disaster prone areas and how their vulnerability might be affected by climate change. The agricultural sector stands out in this analysis as particularly vulnerable.

While it is acknowledged that further work using vulnerability mapping is needed to better identify priority areas for investment, the SPCR states that some geographical priorities for early action can already be identified. The pilot investments are therefore focused on: (i) the city of Beira – the second most populous urban area in Mozambique, which is extremely vulnerable to coastal storms, cyclones and sea level rise; (ii) the productive agricultural lowlands along the Zambezi and Limpopo river corridors; and (iii) the semi-arid drylands of Gaza, where the effects of drought on agricultural production and livelihoods are already evident.

As part of the investment plan development a review of existing initiatives was undertaken – covering existing and proposed strategic plans for climate change, studies and programs (see Section 3 of the SPCR). The SPCR has prioritized activities taking into account the NAPA. There is a proposal put forward by INGC and MICOA to develop a national climate change strategy, and a draft national ‘Program Assistance to Climate Change’. INGC has recently prepared an US\$5million Disaster Risk Management Plan - aimed at building policy, strategies and institutions; identifying, assessing and monitoring risk; and reducing underlying risk factors. The PPCR is working to ensure that the Strategic Environmental Assessments (SEA) planned for the locations covered by the SPCR are coordinated with the SPCR teams. While a narrative on existing climate change initiatives is provided, the plan would benefit from a statement aligning the proposed plan activities with Mozambique’s development and poverty reduction goals and sector strategies.

*Note: Apologises if I have missed this, but I didn’t see any reference in the pan to these.*

### **Part III: Recommendations**

*Note: The recommendations will be further developed following comments on this draft review*

- Outline capacity constraints and priority needs. This will be linked to an understanding of data and information requirements to successfully execute the pilot investments and the capacity to generate this information in the proposed timeframe.
- Develop logical / results framework
- [Develop cost effective analysis] *Note: This requires data so I suspect this is best left to Phase 2*
- Discuss how existing initiatives will be built on by the SPCR and how the plan aligns with Mozambique’s development and poverty reduction goals and sector strategies.
- Develop information on baseline and indicators and risks for the proposed investments projects. In some cases information on these is missing. From a program management perspective it would also be good to highlight how risks might be mitigated.
- The plan does not include an analysis of the risks of climate change to the private sector

### **Editorial recommendations**

*Note: I have not focussed on this and assume that typos etc have been picked up through your editorial review*

- It would be clearer if the bullets in figure 9 ‘The Three Pillars of Mozambique’s SPCR’ matched the text headings in paragraph 65, and if the text and figure appeared in the same section of the document.
- A number of acronyms are missing from the list – e.g., SPCR, SMEs, IIAM, AFDB, REDD – there may be others. (This has been updated)



REPUBLIC OF MOZAMBIQUE  
MINISTRY FOR THE COORDINATION OF ENVIRONMENTAL AFFAIRS  
OFFICE OF THE MINISTER

Reference Letter N° *157*/GM/MICOA/11

**Subject: Submission of the Mozambique's SPCR to the PPCR Sub-Committee**

**Dear Madam**

On behalf of the Government of Mozambique I submit the Strategic Program for Climate Resilience (SPCR) of Mozambique for the due appreciation of the PPCR Sub-Committee.

I honourably take this opportunity to thank the PPCR Sub-Committee for having selected Mozambique to be part of the 9 PPCR Pilot Countries. I also thank all the MDB's, and particularly the World Bank for the financial and technical support provided for the preparation of the SPCR.

In this regard, I would like to emphasize that the consultative processes followed by the country in the preparation of this SPCR, including the nature of the selected investment projects, clearly demonstrates the country's vision and commitment to use the PPCR funds to build resilience of the economy and local communities to the expected impacts of climate change and variability.

I therefore, look forward to hearing from you and meet you in Cape Town in the presentation of the Mozambique's SPCR.

Yours sincerely

*The Deputy Minister*

*Drª Ana Paulo Samo Gudo Chichava*

To

**Ms. Patricia Bliss-Guest**  
**Program Manager**  
**Climate Investments Funds Administrative Unit**  
**World Bank**