Environment and Climate Change Policy Brief – Mozambique

Generic outline

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1. Introduction

This policy brief is based on a desk study and has been written by Gunilla Ölund Wingqvist at Sida's Helpdesk for Environment and Climate Change at the request of Tomas Andersson, Sida. The intention of the document is to feed into Sida's Poverty Development Analysis (or Assessment Draft to Ministry of Foreign Affairs) and the preparations for a new cooperation strategy for Mozambique. The aim is to facilitate integration of environment and climate change risks and opportunities into Swedish Development Cooperation. The policy brief also aims to provide a useful reference when discussing individual interventions under the future strategy, both among Sida staff and where appropriate cooperation partners.

An important step in the strategy process is to have a good discussion on the relevance of environment and climate change risks and opportunities for Mozambique's development and its implications for Swedish development cooperation. Therefore the Helpdesk is also open to participate in person, in tele- and videoconferences to discuss the findings. If there is interest from the Embassy, the Helpdesk may also further develop specific parts of the brief, help comment on assessment drafts (underlag till UD) and in other ways support the process towards a new cooperation strategy. The cost of Helpdesk services are covered by Sida's Global Programme.

2. Country environment and climate change context

The Government of Mozambique (GoM) identifies the major environmental challenges as climatic shocks and seasonal variability, overharvesting of marine and timber resources, and uncontrolled fires. These, and some other key environmental (including ecosystem services[1], disaster risk reduction, and climate change) challenges in Mozambique are listed in Box 1. Many of these environmental challenges are inter-dependent and mutually reinforcing.

Box 1: Key environmental challenges in Mozambique

Climate change and natural disaster risks: Mozambique is prone to natural disasters, especially droughts, floods and storms. The floods during 2000 were especially severe with grave impacts on human lives and livelihoods, as well as on the economy (see Appendix 2). The country is vulnerable to climate change (CC), which is expected to increase the frequency and intensity of the extreme weather events. The sectors/areas most vulnerable to CC are identified as (i) agriculture, (ii) energy, (iii) transport infrastructure, notably roads, and (iv) coastal areas.

Deforestation: Deforestation is a significant problem in the country, deriving mainly from fuel wood collection, shifting agriculture, forest fires, timber exports, and lack of plans for land use. Wood consumption for fuel is estimated to account for 250 times that consumed by logging operations. Although current commercial logging is less than 25% of the legally permitted logging capacity, many believe that it is under-reported and not sustainable. Environmental impacts of deforestation are far reaching and include, among others, land degradation, exacerbated flooding, coastal erosion (mostly from loss of mangroves) and sedimentation.

[1] Ecosystem services are the functions supplied by nature that are necessary for human survival; such as fish, genetic material, bio-energy, crop pollination, air and water purification and food (Government Offices of Sweden, 2010)

Box 1: Key environmental challenges in Mozambique, *continued*

Degradation of marine and coastal resources: Major challenges include coastal erosion, loss of mangroves, and declines in the marine resources including fish. Key threats to sustainability of fisheries in Mozambique are reported to include fishing by unlicensed operators, encroachment by industrial fishing vessels into inshore fishing grounds reserved for semi-industrial and artisanal fishers, deficiencies in recording and reporting of catches, difficulties in controlling the artisanal fisheries that are distributed along the entire coastal line and in the fresh waters lakes and rivers, and a shortage of human resources and infrastructure for implementation of fisheries laws and regulations.

Land degradation: Land degradation, including loss of agricultural soil through soil erosion and desertification, is a major problem. Poor land use practices are the main reasons for land degradation and fire is the main tool for land clearing for cultivation, hunting, logging and acquisition of other non-timber forest products. Forest fire is a serious issue; approximately 40% of the country is affected by fire each year. The north, western and central parts are most affected, with approximately 74% of these areas burnt annually.

Inadequate management of water resources, water pollution and sanitation: Mozambique has abundant surface water resources, although unevenly distributed in time and space. Over half of the water resources emanates from abroad, which makes regional cooperation important. Despite the water abundance, Mozambique faces a number of challenges* to provide adequate water for domestic, agricultural and industrial use. Pollution can be a problem in certain localities, primarily from agriculture (sedimentation, and pesticide and fertilizer runoffs), industrial activities (discharge of untreated waste containing heavy metals, hydrocarbons, etc.) and sewage and domestic waste (most of which is discharged without treatment directly to the rivers and sea). Artisanal mining is reported to cause extensive erosion and silting in some areas.

Loss of biodiversity and ecosystem services: Mozambique has a large diversity of wildlife, although large mammal populations were severely depressed during the civil war. A number of areas** are identified to have outstanding ecosystem, biological, or scenic values and should be treated with care when considering impacts of development. Ecosystem services are degraded in some areas, where Gaza, Manica, Nampula, Sofala and Tete standout, and human well-being is threatened.

Air pollution (indoor and outdoor air pollution): Indoor air pollution, mainly from wood fuels, is a significant health problem, especially for women and children. In certain areas outdoor air pollution is a problem adjacent to mining industry (dust, SO2, lead, arsenic and other smelter gas substances).

Chemical load: Releases of chemicals and heavy metals derive from industrial and artisanal mining activities and agriculture, mainly commercial. Agricultural chemicals and fertilizers are reported to be widely used in the intensive farms in Incomati, Umbeluzi and Maputo River valleys, particularly in the sugarcane plantations in the Umbeluzi River valley in Swaziland. Rivers are the main pathway through which agrochemicals enter the coastal and marine environments, and water samples collected in Monapo, Pungué, Maputo, and Incomati rivers have tested positive for various pesticide residues, including DDT, lindane, and hexachlorobenzene.

*The challenges include: (*i*) the high variability of precipitation; (*ii*) substantial lack of water resources infrastructure; (*iii*) its geographic location as a downstream riparian of most of its major rivers; (*iv*) extremely low efficiency and rapid deterioration of existing systems; and (*v*) serious equity issues as a large share of the poor has little or no access to water for its basic needs.

**These areas include the Gorongosa Mountain - Rift Valley Complex, The Cheringoma Plateau, Zambezi Delta Grasslands and Swamps, The Great Inselberg Archipelago, The Chimanimani Massif, The Maputaland Centre of Endemism (MCE), Coastal Barrier Lakes, and the Pebane Evergreen Coastal Forests.

3. Key poverty-environment linkages

For a developing country like Mozambique, poverty and environment are closely interconnected: the poor may, due to lack of alternatives, be a cause of environmental degradation. On the other hand, a degraded environment may increase poverty, e.g. through decreased access to natural resources and ecosystem services. The environment matters greatly to people living in poverty, and the poor are most affected by environmental degradation and climate change due to their vulnerability, high dependence on natural resources, and low capability to cope with external shocks, such as floods and droughts. Climate change is likely to worsen both the country's poverty reduction efforts *and* its drive for economic development, as well as severely impact the environment.

3.1 Who are the poor?

Despite the high economic growth since mid-90s, more than half of Mozambique's population remains in poverty, with persistent gaps between farmers and city dweller, women and men, and poor and rich. Poor households are disproportionally found in agriculture (both in rural and urban areas) and are highly vulnerable to climatic shocks and seasonal income shortfalls. More than half of the urban dwellers engaged in agriculture are categorized as absolutely poor. Moreover, poverty has a strong gender aspect, and female-headed households are more likely to be poor, especially in rural areas.

Vulnerable groups are identified as being the elderly, disabled, chronically ill (including those living with hiv/aids), orphaned or abandoned children, or single-parent households. Vulnerability is related to community and household capacities to deal with unexpected shocks and risks. The *most common risks* are associated with climatic variations or natural disasters (especially droughts and floods) and loss of crops, rapid consumer price inflation, or illness.[2]

3.2 Poverty as lack of natural resources and ecosystem services

To many of the poor people in Mozambique, natural resources are important for their livelihoods. Land and water, for instance, constitute important assets for agriculture, which make up a large share of household incomes. Forests, fisheries, and other natural resources provide food, building materials, medicine and energy. Access to clean water and sanitation facilities are important for all aspects of life. Lack of access to natural resources may therefore be a key constraint to improved livelihood opportunities and increase vulnerability due to reduced access to important resource-based safety nets.

Agriculture, mainly rain-fed, is important to a vast majority of the Mozambicans, and land and water are key assets. While a normal-size *machamba* is around 1.2 ha, a family also needs access to at least 30 ha of land to support itself (to obtain timber, building materials, bush meat and other non-timber forest products) and even more for free ranging of cattle.[3] Farming is done traditionally with shifting agriculture, and a plot is utilized during a few years and then left to rest, while the family must find a new land area to cultivate. Currently access to vast areas of land is thus important for livelihoods.

It is commonly said that Mozambique's land resource base is abundant for everyone. However, a recent land availability assessment concludes that less land is available than expected; in 2010, 6.5 million hectares remain 'available' for agricultural activities; however,

[2] World Bank, 2008.
[3] SCC, 2010.

this area does not take into account community land rights that have not yet been registered, and it does not include access to future *machambas*. Natural resource extraction (mining, commercial logging, biofuel production, etc.) increases competition over land and may limit the rural population's access to land in the future (see section 3.3).

77% of the urban population has access to an improved water source, and 38% has access to improved sanitation facilities. For the rural population, the figures are significantly lower: 29% has access to an improved water source, while a mere 4% has access to improved sanitation.[4] This low access to water and sanitation (especially in rural but also in peri-urban areas) has serious impacts on people's health and threatens the possibility to obtain the millennium development goals (MDG).

Wood fuel is the most important source of domestic energy and 85% of total household energy requirements derive from wood fuels. Logging for wood fuels is a significant driver for deforestation and leads to soil erosion and increased risk of flooding and drought. Deforestation will also increase the amount of effort (especially from women and children) needed to find energy sources for household needs.

3.3 Poverty as lack of power

Access to natural resources may be limited due to different reasons, may it be low availability, unequal distribution, or due to a lack of power to access these resources. Poverty as lack of power can *inter alia* be linked to insecure natural resource tenure, limited access or capacity to process information, or limited ability to take part in decision-making over local resources. Vested economic interests may be strong related to high-value natural resources and difficult to overcome.

As stated above, land is a key asset to Mozambicans. Land in Mozambique remains state owned although local rights, acquired by occupation according to customary norms and practices, are recognized and must (according to the 1997 Land Law) be taken into account when the state allocates new Land Use and Benefit Rights (DUAT). Farmers need access to land beyond that of the current agricultural plot to fulfill their needs, and land titles are important for communities and individuals so that they can claim their rights if the land is to be used for other purposes. Activities that can challenge community land rights include land acquisition for natural resource extraction such as mining, forestry, and bio-fuel production (see Box 2).

Box 2: Interest in land in Mozambique

Mozambique is experiencing a boom in the ***mining*** sector, especially coal. Several large, multi-billion dollar investments are on the verge of making the country a major new international coal producer. 1,076 titles have been issued to mining companies and another 391 requests were received in the first quarter of 2011.

Recently, there has been high demand from foreign companies for access to large areas (in excess of 150,000 hectares) for new ***forest*** plantations. Particularly, there has been a sharp increase in requests for the so-called 'simple licenses', which are much less regulated than the 'ordinary' forest concessions.

Another sector with high economic interest is ***bio-fuel*** production. In 2006, approximately five million hectares were planted countrywide (one sixth of the total available arable area). Currently, the state has requests for use rights for more than 12 million hectares, or more than double the area currently planted. The majority of these requests relate to bio-fuels, particularly sugarcane and sweet sorghum for the production of ethanol and jatropha for the production of biodiesel. Particularly sugarcane production is water intensive.

Source: Economist 2011; De Wit et al., 2010; Arndt et al., 2008

[4] CIA FactBook

New investors applying for DUATs are obliged to negotiate with communities over the right to access and use land. However, many investors do not accept local rights as DUATs; they are told that the "land belongs to the State" and do not understand why they have to deal with local people. Consequently, people are not consulted in a proper sense as provided for in the Land Law, and they do not have a clear understanding of the issues at hand. The relationship between communities and investors is unbalanced in all aspects because communities are weak in relation to investors. Studies show, that there are two key issues in relation to land rights in Mozambique: (i) it is not the area of the present *machambas* that is the main issue, but the limited access to future *machambas* and other natural resources, and (ii) communities do not fully understand that agreeing to giving out land rights, for instance to forest plantations, will restrict the community's access to this area.[5]

3.4 Poverty as lack of choice

The poor may, due to lack of alternatives, be a cause of environmental degradation for example by overexploitation of resources, or – due to lack of capital or secure titles – be unable to perform necessary investments to protect or improve their assets (such as agricultural land). Lack of health can leave people without income and force them into unsustainable coping strategies, such as selling out assets, or changing their diet into a less nutritious one. Food insecurity may affect health and thereby choice. Opportunities to significantly reduce exposure to environmental health risks such as water and air pollution are often out of reach for many poor.

Insecure tenure means that a person cannot trust that one's resource rights will be respected over time, and will thus be reluctant to make investments and use the resource in a sustainable manner. Agriculture is important for Mozambique, and the agricultural potential is large. However, the productivity is low even by Sub-Saharan African standards, and Mozambique is not entirely food secure. More than half of its 23 million people suffer from under nourishment and a large majority of children are anemic and suffer from malnutrition. Recurrent climatic hazards and soaring food prices force many households to resort to harmful coping strategies, such as selling assets that their families need (domestic animals, firewood and building poles) in order to meet basic food requirements.

Mozambicans experience "a very high risk"[6] of being infected with water borne and vector borne diseases, which is linked to the low access to improved water sources and sanitation facilities, and improper management of water resources. WHO estimates that there are more than 37 500 annual deaths in Mozambique due to diarrhoea caused by polluted water/bad hygiene[7], indoor air pollution and outdoor air pollution. See Table 1 for comparison with Kenya, Malawi and Tanzania. The DALY[8] for diarrhoea is relatively high in Mozambique, while the DALY for indoor air pollution (caused primarily by use of wood fuel and charcoal for cooking) is moderate but mainly affecting women and children. Due to the low access to electricity or other energy options, especially in rural areas, people are left with no other choice than to collect wood fuel for household energy consumption, resulting in deforestation, reduced water regulation and -purification.

[5] Åkesson et al., 2009; Orgut, 2006
[6] CIA Factbook
[7] This figure only includes diarrhoeal diseases. Other water related diseases e.g. river blindness are not included. Hence, the total number of deaths related to hygiene, water and sanitation is higher.
[8] The Disability Adjusted Life Year or DALY is a health gap measure that extends the concept of potential years of life lost due to premature death to include equivalent years of "healthy" life lost by virtue of being in states of poor health or disability.

Table 1. Estimated deaths and DALY's attributed to selected environmental risk factors

	Water, Sanitation & Hygiene		Indoor air pollution		Outdoor air pollution	
Country	Diarrhoea Deaths/ year	Diarrhoea DALYs /1000 capita per year	Deaths/ year	DALYs/ 1000 capita per year	Deaths/ year	DALYs/ 1000 capita per year
Kenya	21 800	23	13 00	12	600	0.2
Malawi	17 100	47	13 300	36	600	0.7
Mozambique	**26 900**	**47**	**9 700**	**16**	**900**	**0.6**
Tanzania	28 200	26	27 500	24	1 000	0.4

Source: WHO, 2007

Ill health and malnutrition obstruct income generation activities and lowers productivity, and make the family members more vulnerable. Climate change is expected to increase the environmental risk burden and increase the risk of water-borne illnesses. A changing climate may also adversely impact health through a possible expansion of the mosquito population, potentially bringing higher rates of malaria and increased risk of cholera during periods of increased precipitation or flooding.

4. Key environmental challenges and opportunities for development

4.1 Key environmental challenges and opportunities

Natural resources, well-functioning ecosystems and their services are important for household incomes as well as to the national economy. Therefore, maintaining or improving the quality of natural resources and ecosystem services provide opportunities for Mozambique both to reduce poverty and to achieve long-term economic growth. Currently, however, the environmental degradation is costly and totals nearly USD370 million annually – which is over 6% of Mozambique's GDP. Costs of water and (particularly indoor) air pollution make up about 70% of the total costs and have a strong impact on Mozambique's human capital. Investments in water, sanitation and reduction of indoor air pollution can have strong positive socio-economic impacts.[9]

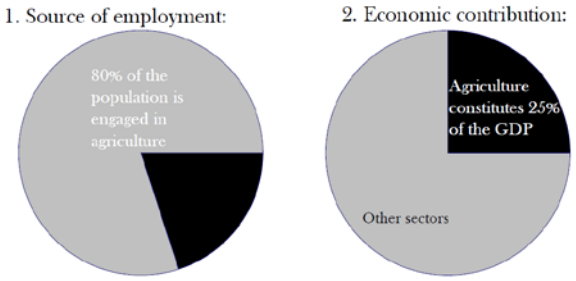
Agriculture, employing around 80% of the rural and urban population[10], provides a large share of household income and contributes with 25% of the GDP (see Figure 1). In addition, the ***forestry*** sector contributes 3-4% to the GDP, with increasing foreign investments. Agriculture (and forestry) is thus important for Mozambique.

The agricultural potential is large and one of the country's strengths. Rehabilitating the agricultural sector is key to countering the effects of soaring food prices on the country's most vulnerable. Climate change is expected to affect especially the rainfed agricultural sector, mainly through decreased yield of major crops. Impacts are worsened by the widely used slash and burn technique and uncontrolled fires. Climate change could, combined with effects

[9] Austral Cowi, 2010.
[10] 90% of the economically active women (65% of the men) work in agriculture (Gov of Moz, 2006)

of more frequent flooding on rural roads, result in an agricultural GDP losses between 4.5% (conservative estimates) and 9.8% (worst-case scenario).[11]

Figure 1. Contributions of agriculture in Mozambique to job opportunities and GDP



Source: Cunguara, 2009

Agriculture in Mozambique can basically be divided into two sectors: (1) a large subsistence sector characterized by rudimentary technology, home consumption, and high levels of volatility and (2) a small but growing commercial sector.

There is a widespread assumption that improved technology will improve household income in the subsistence sector. There may, in fact, be positive indirect impacts, through freeing family labor to engage in off-farm employment. These types of employments may increase family income significantly (44-98%). However, using improved agricultural technology does not necessarily have a direct impact on the income of households in rural areas, at least during years of drought, as improved technology require adequate rainfall to be effective. *More important than new technology, is to reduce structural barriers* (i.a. access to paved roads, credits, storing capacity, etc.) *to market participation.*[12]

The commercial sector, such as ***biofuel*** production, provides an opportunity for Mozambique to substantially increase economic growth, enhance production and welfare, and reduce poverty. Globally, biofuel production provides the opportunity to reduce climate change by replacing fossil fuels[13]. According to Arndt et al. (2008), careful attention should be paid to the labor intensity of production methods. The degree of labor intensity has the potential to strongly influence the distribution of income. Growth and poverty reduction benefits are further enhanced if the schemes result in technology spillovers to smallholders' other crops. Overall, while welfare and food security broadly increases due to enhanced purchasing power, certain households may be negatively affected due to the price and quantity adjustments associated with rapid growth in biofuels production. Furthermore, great care should be given to land-right issues (section 3.2), water availability, effects of conversion of unused land, risks of increasing food prices, methods for mitigating downside price risk for biofuels, and risks associated with climate change.

Mozambique hosts a significant quantity of minerals, and plays a significant role in the world's production of aluminum, ilmenite, tantalum, and zircon. The ***mining*** sector contributes with over 50% of national exports. Moreover, the mining investments are increasing rapidly, especially in coal. While current activities mainly are in Tete province,

[11] World Bank, 2010.
[12] Cunguara and Darnhofer, 2011.
[13] Potential to reduce greenhouse gas emissions depend for instance on the crop, production system and previous land use, and whether the analysis includes indirect emissions from land use change (Engström, 2009)

new coal deposits are being investigated in Niassa. Seven companies are now prospecting in Maniamba. The mining boom will be a welcome source of jobs, but it may also sharpen inequality and increase frustration among the majority of people who will not directly benefit from it. From an environmental point of view, coal extraction will contribute to global climate change through greenhouse gas emissions, and risk local pollution at extraction sites to land, water, and air with potential impacts on human and ecosystem health. New mining sites may furthermore conflict with customary land rights. Small-scale and artisanal mining activities, such as gold-panning, are common in Mozambique; in 2003 it was estimated that 90% of all mining activities were artisanal, and in 2008 about 50,000 artisanal miners were estimated to be employed in the production of colored gemstones and gold. The use of mercury for gold-panning constitutes grave health risks to the artisanal miner (especially to pregnant women and children), and the activities can be a major cause of erosion and siltation, which for instance has been the case in the Pungué river basin.[14]

The ***tourism*** potential is large. In 2008, Mozambique received over 2.2 million international visitors; a nearly quadrupling since 2005[15]. Table 2 shows the contribution of the tourism sector to GDP and job opportunities in Mozambique during 2000, 2005, and 2010. Healthy ecosystems are the main asset to attract tourists, but should be combined with infrastructure such as roads, transportation, and hotels. Developing the tourism sector provides an opportunity for Mozambique, but should be done with care in order not to lose the natural resource assets which are the foundation of the sector. Environmental Impact Assessment (EIA) for investments, and Strategic Environmental Assessment (SEA) for the whole sector, are useful tools in this matter.

Table 2. Travel and tourism sector – contribution to GDP and employment

Mozambique	**2000**	**2005**	**2010**
Travel & Tourism Total Contribution to GDP			
- Contribution to GDP by direct and indirect tourism (USD billion)	0,185	0,388	0,684
- Contribution to GDP (% share of total spending)	4,2	5,9	7,1
Travel & Tourism Total Contribution to Employment			
- Job opportunities (% share of total)	3,7	5,1	6,2
- Number of jobs created (thousand)	269,6	402	567,5

Source: World Travel and Tourism council

Land acquisition increases competition for land. In 2008, there were 76 identified land conflicts. The causes to these conflicts include: high demand for land for tourism investments on the coast; poor dissemination of the Mozambican legislation to local communities; deficient community consultation processes; and, in the case of community/investor boundary disputes, not rigorous enough delimitation of areas (giving more land than authorised).[16]

Mozambique has the third longest coast line in Africa. Marine fishery, which is tremendously important for nutrition and well-being of the population, involves both artisanal, semi-industrial and industrial fishery. The ***fishery*** sector is important for livelihoods of coastal populations, and accounts for about 8% of total exports. Traditional fishery accounts for 85% of the catch for domestic consumption. Marine fishery is threatened by overfishing, habitat degradation, pollution and natural disasters, which have impaired the ability of coastal populations to meet their basic economic and social needs. Coastal areas are particularly

[14] Economist Intelligence Unit (2011); Yager (2011); and Gavin (2003)
[15] World Bank, WDI: http://data.worldbank.org/country/mozambique
[16] DNTF, 2008

vulnerable to sea-level rise and increased intensity and frequency of storm surges associated with climate change. Without adaptation to climate change, a cumulative number of 916,000 people could be forced to migrate away from the coast (or 2.3% of the 2040 population). In the worst case, the total annual damage costs are estimated to reach $103 million per year in the 2040s, with the forced migration being a large contributor to that cost. High value and vulnerable locations, such as cities and ports, could be given adaptation priority.[17]

Energy and road sectors are important engines of growth, both to promote access to markets, value-added opportunities, and human development. Only 7% of Mozambicans have access to electricity. ***Electricity*** production in Mozambique is almost entirely based on hydro power. Impacts of climate change on energy supplies are expected to be only modestly negative. This is because the plans for new energy generation plants have largely already taken into account changing patterns of temperature and precipitation. The most significant CC impact would be from increased evapotranspiration from the reservoirs.[18]

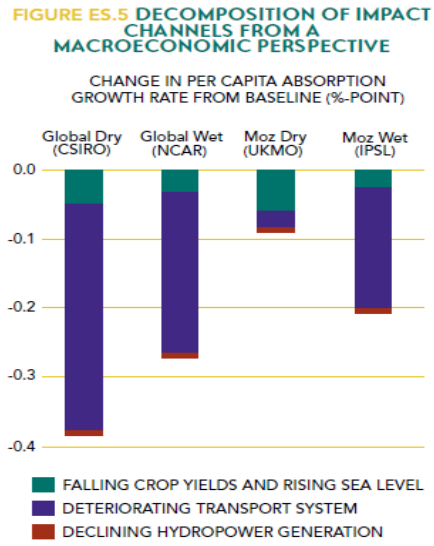
Mozambique has one of the lowest ***road*** densities per person of any African country. The road infrastructure is very vulnerable to climate change, and the economic impacts, especially from severe rainfall events, may be substantial, mainly through loss of access from damage to roads, culverts, and bridges.

An economic analysis of ***climate change*** in Mozambique reveals that climate change may cause the GDP to fall between 4 and 14%, with significant declines in national welfare by 2050. In the worst-case scenario, climate change costs could reach USD7.6 billion dollars, which is equivalent to an annual payment of a bit more than USD400 million, if no adaptation measures are implemented. One of the economically best adaptation options for Mozambique would be sealing unpaved roads, which would reduce the worst-case climate change damages substantially, with little additional cost (a 'no-regret' action, advisable even without climate change). Mozambique is furthermore advised to focus investments on climate-proofing highly targeted areas, such as culverts, 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.

The results further suggest that for the agricultural sector, low-cost approaches are preferred, such as water harvesting, soil/moisture conservation, and agro-forestry and farm forestry. In general, "soft" adaptation measures can be powerful, such as improved access to markets and inputs, support to increased value addition and reduction of post-harvest losses. Because the majority of the capital stock in 2050 remains to be installed, land use planning that channels investment into lower risk locations can substantially reduce risk at low cost. Last but not least, providing primary education to the workforce also offsets damages. Costs for climate change adaptation, to restore welfare losses, are subject to debate but are reasonably less costly than the cost of not adapting. The World Bank firmly states that "the best adaptation to climate change is rapid development that leads to a more flexible and resilient society. In this sense, the adaptation agenda largely reinforces the existing development agenda**.**[19]

[17] World Bank, 2010
[18] World Bank, 2010.
[19] World Bank, 2010.

Figure 2: Illustration of economic impacts from climate change, in agriculture, transport, and hydropower sectors, for different scenarios



Source: World Bank, 2010

Box 3: Comment to Figure 2

Figure 2 illustrates impacts from climate change in a macroeconomic perspective for different scenarios.

The first, 'Global Dry' (CSIRO) scenario is in fact a ***wet*** scenario for the Zambezi basin including Mozambique, with significant damages to roads. The graph demonstrates the dominant role of transport system disruption in this scenario, principally as a result of flooding.

By contrast, the third graph in Figure 2 illustrates very dry conditions for Mozambique ('Moz Dry') where the damages on agriculture are larger.

The global attention to climate change is expected to result in large amounts of climate finance, including funds for adaptation and low carbon growth, and increased attention on biofuels. Mozambique could investigate opportunities related carbon sequestration related for instance to its forests. To attract climate-related funds it is of utmost importance that the national systems for e.g. public financial management can be trusted, that the rule of law is applied, with high degrees of transparency and accountability and low risk of corruption. There must also be capacity available to assess, access, and prioritize the different alternatives available and most suitable for Mozambique.

4.2 External and internal factors influencing environmentally sustainable development

An important external factor influencing environmentally sustainable development is the global trade and countries' quest for natural resources. One example is China's increasing demand for timber, which affects logging also in Mozambique. Another external constraint is the fact that Mozambique is the downstream country of nine international rivers and vulnerable to both floods and periods of drought. Water availability is key to growth-sectors such as agriculture and electricity generation. Regional cooperation on operationalizing and implementing the revised SADC Protocol on Shared Watercourse Systems, including for instance principles for water allocation and early warning systems, is especially important to Mozambique.

Maputo has experienced occasions of civil unrest and bloody riots a few times during the last years, triggered by higher cost of living for instance related to prices on urban transportation and bread. The biggest risk to social stability is rapid consumer price inflation, which global commodity price rises could lead to. As a response, the government has introduced a number of costly and ill-targeted subsidies, e.g. to fuel, urban transportation, and wheat. Research shows that subsidies to transportation fuel, besides being costly[20] and environmentally

[20] The transportation fuel subsidies are estimated to amount to approximately USD70 million or about 2.5 percent of total government expenditures (Metell, 2010, referred to by Slunge et al., 2010)

unsustainable, also benefits rich more than the poor and thus contributes to increasing inequalities in the country[21]. Abolishing the subsidies will expose the government to the risk of further unrest in future. Increased cost of living poses a greater threat to Frelimo's hegemony than do the opposition parties, which makes the issue of subsidies a politically sensitive subject. In urban areas, price rises, power cuts, unemployment, delayed official response to disease outbreaks or flooding, are identified as triggers of unrest.[22] Other internal constraints to environmentally sustainable development in Mozambique include weak institutions, lack of coordination, compartmentalization of policies and legislation, and high levels of corruption. Corruption is often associated with natural resource depletion and environmental degradation, while reducing revenues that could be used for improved environmental management. Lack of transparency and accountability is another aspect of poor governance linked with environmental degradation, concessions and natural resource use.

5. The government's environmental commitments and actions

A country report of the African Peer Review Mechanism (2009) states that although Mozambique has made remarkable progress, the government needs to give continued attention to the increasing inequalities, and issues of land rights, and give emphasis to combat corruption, improve development policies, and enhance political inclusion. Mozambique currently attempts to address these issues, with a varying degree of success (see below).

5.1 Environment in the national strategy for development/growth

The Poverty Reduction Action Plan (PARP) 2011-2014 is the medium-term strategy of the Government of Mozambique (GoM) for putting into operation the five-year government program "Programa Quinquenal do Governo para 2010-2014". PARP is seen as a continuation of the former poverty reduction plan for 2006-2010 (PARPA II). The five year government program aims to cut poverty, improve social development and foster key sectors, including agriculture, fishery, minerals, tourism and transport. The PARP is a bit narrower, focusing on enhancing productivity of agriculture and fishery, employment, and human and social development while maintaining a focus on governance, macroeconomic affairs and fiscal management. Improving fishery and land administration, as well as access to markets, are given priority.

Legislation and policy making in the field of environment is of reasonable quality. The GoM appears to be aware of the importance of natural resources, and includes aspects of environmental and climate change challenges in the PARP. However, implementation and monitoring is weak and uncoordinated. The PARP points out the need to improve coordination, coherency and consistency of policies and strategies to be able to reach its objectives. Our assessment it that these aspects (coordination, coherency and consistency) will become increasingly important when integrating climate change challenges.

A study of environmental institutions and public expenditure concludes that the link between policy statements and budget allocations in Mozambique is weak. Although environment was well integrated in the PARPA II, the actual budget allocation to environment was a mere 0.9% of GDP, which is considerably lower than the World Bank's recommended spending on the environment for developing countries (between 1.4% and 2.5%).[23]

[21] Robinson et al., 2009
[22] Economist Intelligence Unit, 2011.
[23] Cabral and Francisco, 2008

Environment and climate change is coordinated by the Ministry of Coordination of Environmental Affairs (MICOA) but should be implemented at sector level. Many sector ministries have established their own environmental institutions, but these are not adequately coordinated by MICOA and there are weak institutional links between MICOA and the sector ministries. Climate change, especially, lacks a champion and the division of responsibilities and mandates between different organisations is not clear. Few sector ministries are working with climate change issues. MICOA is weak and lacks political leverage as well as human, technical and financial resources. The National Council for Sustainable Development (CONDES), mandated to promote cross-sectorial dialogue and monitor implementation of policies related to environmental management, has failed to position itself and is hardly noticed.

Several new laws and policies have been created to safeguard the environment and let communities benefit from extraction of local resources. One interesting example is that natural resource concessionaries should pay 20% of their revenues to the communities where the natural resources are being used. After a slow start, this policy has started to be implemented for forestry and wildlife, although the actual remuneration differs between provinces and large amounts still appear to be outstanding. Table 3 shows the share of the payments to different provinces.

Table 3. Payment of 20% community share from forest & wildlife revenues, 2006-2008

Province	No. of Community Groups registered	% payment rate
C. Delgado	79	37%
Gaza	35	37%
Inhambane	30	38%
Manica	32	54%
Maputo	25	40%
Nampula	63	83%
Niassa	10	32%
Sofala	18	23%
Tete	35	53%
Zambezia	109	104%
Grand Total	**436**	**50%**

Source: De Wit and Norfolk, 2010

The number of community groups registered and benefitting from the 20% payments from forestry concessions is highest in Zambézia. Benefits flowing to community groups in Niassa province are minimal. Variations may relate to capacity and political will, but most especially the presence of strong NGOs.

The long delays in establishing the community benefit payment system is related to the state's reluctance to devolve power and control over land. The reasons for this reluctance include the economic interests of state agents in valuable natural resources and a fear that securing local community land rights may block private investments. [24]

[24] De Wit and Norfolk, 2010.

5.2 Economic policy and environment[25]

Global food prices are expected to grow by 30%, which is especially relevant to inflation in a country so dependent on food imports as Mozambique. Agriculture is likely to benefit from growth in the output of food and cash crops, as well as from the implementation of the government's national food production plan. Agricultural export is expected to increase as a response to government investments. However, it may be worthwhile to monitor the allocation of funds to the agricultural sector. In 2011, investments in agriculture are less than 10% of the MT19bn allocated to capital spending on infrastructure. Considering the importance given to the sector, investments should follow.

There are a number of different sources of revenue generation by environmental and natural resources management activities. Most of these internally generated revenues, originate from granting of concessions and licences for the exploitation of natural resources. However, information about environmental revenue collection is particularly scarce and fragmented. Revenue from forestry alone amounted to USD 6 million in 2006, but despite the magnitude neither the state budget (OE) nor the state account (CGE) contains any information about it.

The fuel subsidy has been a costly intervention and is to be abolished gradually. Likewise, subsidies for urban public transport (when diesel prices exceeds MT31/liter) are to be replaced with a new scheme targeted at workers, students, and the elderly. The state-owned bus company TPM is the government's preferred option for urban transport (where 90% is performed by private operators). TPM wants to raise its fares by 40% (from MT5 to MT7), to cover running costs and service a USD20m government loan. However, TPM were not allowed to raise the fares. The Mozambican authorities have been advised that general subsidies to urban transport users, who are generally better off, are a poor use of public funds, with weak impact on poverty reduction.

Abolishing these ill-targeted subsidies will be politically difficult, as mentioned in section 4.2, and should go hand-in-hand with an expansion of the social safety net. It will be important to replace the current general and patchwork approach to subsidies with systematic and well-targeted subsidies towards the poor, both from an environmental point of view and to prevent further civil unrest.

The mining sector is not a priority of the PARP but is included as a key sector in the 5-year government program and is important for the country's economy. Mozambique is currently planning an adjustment of the mining sector legislation. The purpose is to increase government revenues from mining activities. The mining legislation will be revised and discussed with license holders on tax treatment and other investment terms including environmental protection and an overhaul of different types of mining titles. The mining investment overhaul is leading to concern among foreign mining companies over the impact on their investments. Experiences from Zambia and Ghana are that efforts to alter the terms of existing mining contracts often are met with strong opposition from mining companies.

5.3 PFM-system[26]

It is clearly stated in PARP that the Medium-Term Fiscal Framework 2010-2014 (CFMP) should reflect the budgetary allocation for PARP objectives. However, one of the major challenges to implement environmental policies is the lack of environmental financing from

[25] If nothing else is stated, this section is based on: the Economist Intelligence Unit, 2011
[26] This section is based on: Cabral and Francisco, 2008.

the national budget. 'Environment' is often financed by international development partners on a project-basis, with the risk of turning MICOA staff into project managers with limited time available to perform and develop its core functions. Significantly more efforts are needed to improve the capacity of MICOA to be actively involved in the budgetary process.

The main public sector constraints to efficient environmental management include:

(i) the lack of clear policy prioritisation in policy documents;
(ii) the lack of transparency of budget planning and accounting instruments; and
(iii) the sheer dependence of external funding which implies that important resource negotiations take place outside the framework of the state budget formulation.

5.4 International environmental obligations

Mozambique is a party to many of the major multilateral environmental agreements, including Biodiversity, Climate Change, Desertification, Endangered Species, Hazardous Wastes, Law of the Sea, Ozone Layer Protection, Ship Pollution, and Wetlands. The status of Mozambique's implementation to the conventions on climate change and biodiversity is briefly stated below.

UN Framework Convention on Climate Change (UNFCCC): Mozambique has submitted the First National Communication on Climate Change (2006), and the National Adaptation Programme of Action (NAPA) (2008) to UNFCCC. High priority activities for adaptation identified in the NAPA, include: early warning systems, strengthening capacity in the agricultural sector to adapt to climate change, reduction of impacts from climate change in the coastal zones, and management of water resources. As climate change is a cross-sectorial issue, activities are going to be implemented by different institutions. This highlights the need of improved integration and coordination.

Convention of Biological Diversity (CBD): Progress towards the goals and objectives of the convention are reported to be significant and visible in Mozambique. For instance, Mozambique has increased the number of protected areas, mostly in coastal and marine ecosystems, with involvement of communities and the private sector.[27] The 4th National Report to the CBD (2009) reports that a remaining constraint is the weak coordination at inter-institutional level, and lack of human and financial resources. Remaining challenges include: need for improved institutional and inter-institutional coordination and integration; need for more institutional and technical capacity; environmental monitoring and inspection needs to be improved; environmental education should improve; and a need to focus on emerging issues such as wild-fires, climate change, and man-animal conflicts.

5.5 Corruption linked to environment

Although the introduction of the Anti Corruption Act in 2004 was regarded as a milestone in Mozambique, the country still ranks low in terms of integrity and anti-corruption measures[28]. Corruption, mainly 'petty' but also 'grand' corruption, remains a significant problem. According to Transparency International (2007) key challenges in Mozambique include: lack of investigative power of the Gabinete Central de Combate à Corrupção (GCCC), its limited authority and the ineffective nature of the whistle-blower mechanism in the country.

[27] CBO, http://www.cbd.int/countries/profile.shtml?country=mz#nbsap
[28] According to Transparency International, Mozambique is ranked 116 (of 178), with a score of 2.7, for the Corruption Perception Index.

For environment and natural resources, corruption may be related to i.a. giving out licenses for extraction and public disclosure of resource rents. Lack of accountability is one of the main obstacles to fight corruption. It is also difficult to file complaints and have them processed in the system.

Mozambique has entered the road towards enhanced accountability through increased transparency, by applying for the Extractive Industries Transparency Initiative (EITI). EITI is an international monitoring system aimed at promoting transparency for revenues earned from the extraction of natural resources and thereby preventing funds from being underreported and diverted. Mozambique published its first EITI report in February 2011 and submitted its final validation report to the EITI board in May 2011. Discrepancies between Mozambique's own revenue reporting and the payments reported by extractive companies, amount to MT4.5million (US$166,000). These discrepancies are relatively small, and are explained in the EITI reports as being mainly methodological. Indications are that Mozambique's financial accounting systems are likely to satisfy EITI requirements; however, the EITI board has yet to announce its decision on whether or not Mozambique has fulfilled all the necessary requirements to become EITI compliant.[29]

The RevenueWatch Institute states that in general, civil society views EITI as successful, but there is still room for improvements. Although the EITI process has contributed to enhanced interaction and dialogue between stakeholders, the stakeholder participation could be strengthened. Protection of civil society against intimidation and harassment is identified as a top priority for future improvements.[30] Other challenges related to EITI in Mozambique is the secrecy of contracts (contracts are seldom publicly disclosed), and that companies often have special fiscal treatments.

Furthermore, Mozambique joined the Kimberley Process diamond export certification scheme during 2011. Mozambique does not yet have a significant diamond export but joined out of concern for "conflict diamonds" from Zimbabwe being exported through its territory and in anticipation of diamond exploration, currently under way, leading to exports in the near future.

6. Risks

The risks associated with current policies and practices are associated with continued insecure land rights and associated unsustainable use of natural resources, over-extraction of (mainly fishery and forestry) resources, land degradation and depletion of ecosystem services, with impacts on people's livelihoods, food security, development of growth sectors, reduced state revenues and even impaired economic growth.

The weak institutional capacity in general and of MICOA in particular, risk leading to uncoordinated efforts, low implementation of policies and lack of environmental safeguards, especially related to foreign investments. Tax exemptions affects state revenues, and lack of transparency of resource revenues is related to corruption risks.

Despite the social, environmental and economic value of biodiversity and ecosystem services, there is currently a lack of knowledge, tools and techniques to estimate the "true" value of it. Therefore, biodiversity and ecosystem services are often overlooked in polices. However, it is

[29] Economist Intelligence Unit, 2011
[30] Dykstra, 2011

known that the services we obtain from ecosystems (such as purification of water, regulation of climate, and pollination), are critical for human wellbeing. They are also important to attract tourists. If biodiversity is lost and ecosystems degraded, so that they can function no longer, the socio-economic costs are likely to be large.

Climate change has been identified as a risk in Mozambique. Without adaptation efforts, there is a risk that economic and human costs will be significant.

7. Conclusions

Mozambique is striving to make productive use of its natural resources in order to enhance economic growth and reduce poverty. This is good, but requires a delicate balance between short-term economic growth and social and environmental safeguards. Economic growth and policy instruments need to consider both distributional and environmental effects.

Transparent and participatory policies and regulations, including environmental safeguards, are necessary related to land allocations, natural resource licenses and concessions, as well as resource rents. There should be a focus on raising recurrent, not project financing for public environmental functions. Controlling the use of environmental taxes and user fees for direct funding of environmental agencies could be considered.

Delimitation of land titles must be profoundly participatory, in all aspects (including not only possibility but also capacity to participate). Spatial planning, not least in urban areas, integrating climate change risks, is important in order to avoid building unsustainable structures for transportation and energy.

For international development partners, the sector working groups could be structured to maximize strategic dialogue and minimise transaction costs.

7.1 Issues Sida may consider

From this brief desk review it is fair to conclude that the severe environmental problems Mozambique is facing constitute key challenges to both poverty reduction and sustainable economic development. Sweden is currently supporting Mozambique in the areas of democratic governance, energy, agriculture, and research cooperation, besides the general budget support (GBS). Support to civil society supplements support to the government.

Improving coordination and communication within and between government institutions is critical to mainstreaming. This could be improved in Mozambique. For example, increased collaboration between environment and macro-economic sector partners is essential. Strategically targeting policy makers is also important. The ***GBS*** platform is potentially a powerful window for environmental (including climate change, disaster risk reduction and ecosystem services) mainstreaming. GBS offers three entry points to policy dialogue:

- PAF: Adding more indicators to the PAF may not be desirable as it might diffuse the focus of the overall policy dialogue. However, one or two carefully elaborated indicators might be beneficial; indicators which reflect with accuracy the dialogue being held at higher political levels and which expose the substantive challenges environmental governance currently faces.

- State budget: the monitoring of the budgeting process provide an opportunity for discussion with government on to what extent policy decisions are being transferred into sectorial budgets. Furthermore, some of the obstacles to effective environmental management relate to problems that affect the whole public administration, such as the insufficiency of budget classification systems in use, or transparency of revenues. GBS is a good platform to discuss such type of systemic issues.

- Sector working groups: Donor harmonisation in the environmental field is difficult due to its cross-sectorial nature. Most difficult policy challenges lie outside the mandate of the environmental agencies. Therefore, harmonisation efforts should include also the agencies dealing with economic activities of relevance to environmental management (such as energy and agriculture). Representatives from sector ministries and sector-supporting donors could join the Environment Working Group when relevant subjects are to be discussed, and vice versa. It would also be relevant to cooperate with PEI.

Support to ***agriculture*** is generally considered to be pro-poor and employment generating. It is important to bear in mind, though, that support to the agricultural sector (as other sectors) need to be environmentally sustainable and integrate concerns of climate variability and change, as agricultural productivity is closely related to climatic variations. Furthermore, the support to strategic analysis ought to mainstream environmental and climate change concerns, as these are critical aspects for the future. Low-cost options to promote agricultural productivity, which are environmentally sustainable and takes climate change into account, could be considered.

Strengthened ***democratic institutions***, transparency and accountability are likely to have a positive impact also on the use of natural resources and the environment. Special attention could be placed on transparency of natural resource rents and public participation related to natural resource extraction. Good governance, the rule of law, and trustworthy national systems for instance related to public financial management, will be crucial to obtain international climate financing. Furthermore, Sida could consider support to develop capacity of local government authorities for integrating environment and climate change into district Economic and Social Plans, including support for communities to implement projects promoting environmental sustainability and poverty reduction.

It could be assessed if support to the ***energy*** sector could more explicitly include climate change (mitigation and adaptation) as an objective. It could be interesting to see if there are possibilities for synergies if rural electrification efforts are combined with other household energy efficiency support such as improved stoves or more efficient energy sources.

Furthermore, development partners' sectorial policies and practices should be consistent with national policy positions and practices in the environmental domain. This is an obvious point but often overlooked. The tensions that exist in Mozambique today, between economic development and environmental protection, could be managed with support from donors. Sweden could, for instance through its support to the agricultural and infrastructure sectors play an important role in improving environmental management performance, e.g. in the field of EIA and SEA (which is included in the Paris Declaration on Aid Effectiveness as an important decision making tool). It may be interesting for Sweden to note that PEI highlights

forthcoming studies[31] that help describe linkages between economic growth, poverty and environment.

Finally, this policy brief touches upon a range of highly complex issues. Needless to say, there are many aspects that deserve a much more detailed level of analysis. We hope, however, that this Environmental and Climate Change Policy Brief fulfills its aim of being a point of departure for a discussion on how environmental and natural resources aspects can be integrated into Swedish development cooperation with Mozambique.

[31] Forthcoming studies include: Environmental priorities in Mozambique: Current status and future challenges, by Donor Working Group on Environment (May 2010); Study on institutional linkages (2010); Economic assessment of poverty and environment linkages in Mozambique (2011); Study of financial and economic instruments (2011); and Public Environmental Expenditure Review (2011).

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Appendices

Appendix 1: Key environmental indicators for Mozambique

Sector	Environmental indicator	Value
Health[1]	Life expectancy at birth (years)	48.4
Education[1]	Mean years of schooling (of adults) (years)	1.2
Income[1]	GNI per capita (2008 PPP USD) LN	6.8
Sustainability[1]	Adjusted net savings (% of GNI)	-4.6
Human Security[1]	Refugees (thousands)	0.2
Composite indices[1]	HDI value	0.284 (rank 165)
Economic[2]	Agriculture (% of Gross Domestic Product)	20.9
People[2]	Total population (millions)	23.4
	Life expectancy at birth	48
	Urban population	38%
	Agricultural population, including forestry and fisheries (1000s)	17 788
	Number of people undernourished (millions)	8.1
	Proportion of undernourished in total population	38%
	Child mortality rate (per 1000 live births)	142
Land[2]	Land area (1000 ha)	78 638
	Arable land (1000 ha)	4 500
	Pastures (1000 ha)	44 000
	Irrigated land (1000 ha)	118
	Forest area (1000 ha)	39 022
Share in total water use[2] **by sector**	Agriculture	87.3%
	Industry	1.6%
	Domestic	11.1%

[1] Source: UNDP, Human development indicators Mozambique, http://hdrstats.undp.org/en/countries/profiles/MOZ.html

[2] Source: FAO Website, http://www.fao.org/countries/55528/en/moz/

Appendix 2: Natural disasters

Top 10 Natural Disasters in Mozambique for the period 1992 to 2011 sorted by economic damage costs

Disaster	Date	Damage (000 USD)
Flood	26-Jan-2000	419,200
Flood	11-Dec-2007	100,000
Flood	17-Jan-2007	71,000
Flood	1-Jan-2001	36,000
Storm	8-Mar-2008	20,000
Storm	13-Feb-1996	14,500
Flood	15-Jan-1999	12,400
Storm	26-Mar-2009	3,000
Storm	18-Feb-2000	1,000
Storm	24-Jan-1997	50

Top 10 Natural Disasters in Mozambique for the period 1992 to 2011 sorted by numbers of total affected people:

Disaster	Date	No Total Affected
Flood	26-Jan-2000	4,500,000
Storm	26-Mar-1994	2,502,000
Drought	May-2005	1,400,000
Drought	Mar-2002	600,000
Flood	1-Jan-2001	549,326
Drought	Aug-2007	520,000
Drought	Dec-2008	500,000
Drought	Mar-2010	460,000
Flood	15-Jan-1997	400,000
Flood	4-Feb-2003	400,000

Source: EMDAT Disaster Database, http://www.emdat.be/result-country-profile