



## Namibia Environmental and Climate Change Policy Brief

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This Policy Brief was carried out as a desk study in April to May 2008.<sup>1</sup> In line with the Swedish development cooperation goal<sup>2</sup> the document aims to summarise the key environmental risks and opportunities Namibia faces, related to poverty reduction and economic development.<sup>3</sup>

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### **Introduction**

Namibia is the driest country in Sub-Saharan Africa. Of the country land mass, 92% is identified as hyper-arid, arid or semi-arid. Rainfall is not only low but also highly variable and unpredictable over time and space. Drought periods are endemic due to disturbance and

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<sup>1</sup> This Environmental and Climate Change Policy Brief was written at the request of Sida INEC, Stockholm (att: Rolf Folkesson) by Emelie Dahlberg and Gunilla Ölund Wingqvist at Sida Helpdesk for Environmental Economics, University of Gothenburg as part of Sida-EEU's institutional collaboration on environmental economics and strategic environmental assessment. Comments are welcomed and can be sent to [gunilla.wingqvist@economics.gu.se](mailto:gunilla.wingqvist@economics.gu.se)

<sup>2</sup> The development objective is to contribute to creating conditions for poor people to improve their living conditions through stimulating and strengthening the development of sustainable relations of mutual interest between actors in Namibia and Sweden. Country Strategy Namibia 2009-2011, Draft 2008-03-27.

<sup>3</sup> The ECCA is mainly based on the Country Environmental Profile for Namibia developed by European Commission in 2007. If no other references are made this is the source that has been used.

shifts in the global circulation pattern and the El Nino phenomenon. Namibia is endowed with a rich variety of mineral resources and has a long tradition of mining. Diamond is the country's premier mining commodity. Alongside a stable and open political economic environment there exist high rates of rural poverty, large income disparities and serious HIV/AIDS epidemic<sup>4</sup>, and the human development in Namibia appears to be on the decline<sup>5</sup>. The country is still struggling with its apartheid legacy.<sup>6</sup> Namibia has a high urbanisation rate (33%) and the annual urban growth rate is very high (6%), which hampers provision of adequate municipal service delivery.

## 1. Key Environmental Problems, their Causes and Opportunities

### 1.1 Key environmental problems and their causes

The key environmental problems in Namibia are presented below (not in order of priority):

***Water scarcity and pollution:*** Scarcity of fresh water is a major threat to development in Namibia. In the arid country water resources and wetland systems are very sensitive and needs to be managed well. Groundwater is the single largest natural source of water, accounting for 40% of the freshwater. Perennial and ephemeral<sup>7</sup> rivers provide roughly 30%, and reclaimed water provides 1%, of the freshwater.<sup>8</sup> Namibia's groundwater, which provides a buffer against droughts in many regions of the country, occurs in a wide range of rock types making groundwater management a complex process. Groundwater is highly vulnerable to pollution and unsustainable abstraction. Mining is one cause of groundwater pollution, and bush encroachment significantly reduces groundwater. The agricultural sector is the major user of water in Namibia, consuming about 75%. Overuse of water resources has occurred in many aquifers in Namibia as the overall water use remains higher than the rate of recharge. Estimations show that the country's total water demand will increase with nearly 60% by 2015. The growing pressure rises from population growth, urbanisation, higher living standards, mining and large numbers of livestock.

***Land degradation:*** From the western coastal plain of the Namib Desert to the eastern Kalahari zone, Namibia is characterized by aridity. Land degradation is a nationwide principal problem and the risk for erosion is high in areas with thin or destructed vegetation cover. High soil fertility loss occurs mainly in the densely populated northern region due to population pressure, inappropriate land management and deforestation. Tenure insecurity due to lack of land rights lead to less investments in land and continued land degradation. The trend is towards increased land degradation risk, mainly due to a decrease in annual rainfall, an increase in livestock numbers and/or increased human population.<sup>9</sup> There are roughly 2 million cattle in Namibia, of which over half in the northern communal areas. Overgrazing is the principal cause of vegetation degradation resulting in unprotected grounds, which are vulnerable to wind and water erosion. The continuing land degradation has severe negative impacts on rural livelihoods as nearly two thirds of the population are dependent on agriculture for their livelihood. Desertification - in the form of deforestation, soil erosion, bush encroachment, loss of biodiversity and soil salination – is an additional challenge,

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<sup>4</sup> AfDB et al., 2007

<sup>5</sup> UNDP, 2007.

<sup>6</sup> EU, 2007.

<sup>7</sup> An ephemeral river is a river in which flow does not occur throughout the year, also referred to as a temporary river.

<sup>8</sup> DRFN, 2007.

<sup>9</sup> Klintonberg et al., 2004.

reducing productivity (including water supplies), altering natural habitats and endangering biodiversity.

**Deforestation:** Forested areas make up less than 10% of Namibia and deforestation is modest with a rate of 0.9%. However, forestry resources are under pressure due to agricultural expansion and the growing demand for wood energy for both domestic and construction materials. An estimated 90% of rural households use biomass energy to meet their daily energy needs.<sup>10</sup> The high reliance on wood for fuel creates over-exploitation in certain areas, resulting in woodland degradation. Fuel wood is increasingly scarce in all parts of the country, especially the north. Widespread frequent bush fires have a major negative impact on north eastern woodlands, limiting the growth of young trees and killing older, larger trees.

**Biodiversity loss:** Namibia has remarkable ecosystems and possesses a wide diversity of wild fauna and flora including populations of globally endangered species (e.g. the country holds the world's largest population of cheetahs). Major threat to the terrestrial biodiversity include habitat alteration, unsustainable harvesting of natural resources, inadequate land use practices, population pressure, mining and visitor (tourism) impact in fragile ecosystems. Namibia has some of the richest marine fish resources in the world because of the nutrient-rich Benguela Current. Before the country's independence these resource had been seriously over-exploited and became depleted due to unregulated fishing by many nations. Today, the resource has been rehabilitated but still several commercial species show decreasing trends. Freshwater species are under threat of over-fishing, inadequate fishing methods, poor catchment area management, destruction of riverine vegetation and changes in channel morphology.

**Natural disaster risk:** Namibia has a high risk of climatic and hydrological hazards. Between 1999 and 2003 the country faced six severe droughts and floods affecting over one million people.<sup>11</sup> Almost the entire country is vulnerable to droughts although the southern and western parts are most affected but also least populated. Droughts are aggravated by human activities such as vegetation and soil degradation (overgrazing and over cultivation, deforestation) and overuse of water resources.

**Climate change** – Climate change will add to existing stresses in Namibia including the above mentioned issues particularly related to water scarcity and land degradation (increased erosion from over grazing or intense occasional rains), affecting health and food production. Climate projections, adaptation and mitigation challenges are described in section 3.

## 1.2 Opportunities

Water recycling has been practiced since 1968 in Windhoek, but it becomes more and more important, especially in the mining sector and regional urban areas. Desalination at the coast is planned to reduce water scarcity. Though Namibia has one of the best solar energy potentials in the world, the solar industry is relatively small. Solar energy is an opportunity for the country and to date the Ministry of Mines and Energy is setting up demonstration units (solar home systems, solar water heaters, and photovoltaic pumps) in all 13 regions of Namibia. Moreover, wind energy is largely used in remote areas for water pumping. Community Based Natural Resource Management (CBNRM) has already improved wildlife

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<sup>10</sup> Cecelski et al., 2001.

<sup>11</sup> Guha-Sapir et al, 2004

stocks. This trend provides an opportunity to build business based on eco-tourism and related activities contributing to poverty alleviation.<sup>12</sup>

## 2. Effects of the Environmental Problems

### 2.1 Impacts on Poverty (Vulnerability, Security, Opportunity)

**Vulnerability:** Namibia is ranked as a low middle-income country and has the continent's fifth highest per capita income and the 11<sup>th</sup> highest Human Development Index (HDI). However, incidence of poverty is high including high rate of rural poverty (42%).<sup>13</sup> The Human Development Report 2007/2008 indicates that almost 35% of the population live on less than USD 1 per day and 56% live on less than USD 2 per day. Indices for Human Development and Human Poverty have shown negative trends the last years mainly due to the HIV/AIDS pandemic and its social impacts.

With a Gini coefficient<sup>14</sup> of 0.67 Namibia is one of the most income unequal societies in the world. 0.3% of the population owns 40% of the land and 5% earns almost 70% of the income. High levels of poverty exist especially in the rural communal areas where a majority of the country's population live mainly from subsistence agriculture and livestock keeping. Population density is one of the lowest in the world (2.4 inhabitants/km<sup>2</sup>) but distribution varies from 1-5 inhabitants/km<sup>2</sup> in the central and southern parts to 150 inhabitants/km<sup>2</sup> in the northern parts. Poverty is the main environmental issue in Namibia.<sup>15</sup> In the north 57% of the households are female headed, due to migrant labour.<sup>16</sup> In the rural areas women are the primary providers of food and crops for the household and are disproportionately affected by environmental degradation. Access to housing is inadequate and urban service delivery such as water, electricity, sewage and waste disposal represent severe problems. In the fast growing small and medium-sized towns there is not sufficient financial capacity to improve urban infrastructure.

**Security:** Potential conflicts over scarce resources have been identified, including conflicts over land use and water resources: mining activities, especially in protected areas, can create conflicts over land and undermine ecology and tourism; lack of information on land, of land titles, and of clear land administration in communal areas exacerbates illegal fencing and encroachment, which may create conflicts over land; and tourism and national parks could lead to more diversified income generation from natural resources but also to higher land prices and a risk of conflict between wildlife management and other land use such as agriculture. Increased water scarcity can lead to conflicts between nations over shared water resources and competition between water using sectors. One example is balancing the need to preserve the precious Okavango Delta ecology in Botswana with development plans in Namibia, including a hydroelectric power plant at the Popa Falls or water supply for Windhoek. In addition, climate change may also be a security threat. Even for the best-case scenario, a quarter of the population may need to find new livelihoods, which could result in severe displacements of people and increasing urbanisation.<sup>17</sup>

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<sup>12</sup> Boudreaux, 2007

<sup>13</sup> AfDB et al., 2007

<sup>14</sup> A Gini-coefficient equal to 0 represents total income equality and a Gini-coefficient equal to 1 indicates total income inequality.

<sup>15</sup> DRFN, 2007.

<sup>16</sup> Cecelski et al., 2001.

<sup>17</sup> Reid et al., 2007; and Govt. of Namibia, 2002.

**Opportunity:** Namibia has a low corruption rate. Although the Transparency International Corruption Index has fallen from 47<sup>th</sup> (2005) to 55<sup>th</sup> place (2006) the country is still among the five highest rated countries in Africa. The country's stable and open political environment and favourable growth momentum create a window of opportunity for undertaking structural reforms necessary to spread the benefits of growth more widely.<sup>18</sup>

## 2.2 Impacts on Economic Development

Namibia has experienced several years of moderate economic growth mainly based on its mining industry. The national economy is poorly diversified, relying heavily on export earnings and fiscal revenues from the mining sector (especially diamonds), which contributes to 50% of all exports and almost 10% of GDP, but only employs 3%. The mining industry is likely to continue to form the backbone of the national economy as the potential is there to further intensify mining activities. Other important sectors are agriculture (including livestock, forestry and fishing), which contributes almost 12% to GDP but provides over half of the employments, and tourism that contributes almost 4% to GDP and employs almost 5% (see Appendices 1 and 4). The industrial sector is small. Unemployment remains high (37%), especially among youth.<sup>19</sup> General living conditions, characterized by poverty and decreasing trends in economic security due to unemployment create a dependence on short-term income generation instead of long term, sustainable natural resource management.

Even though Namibia is highly dependent on its natural resources<sup>20</sup> the country has no explicit policy for management of resource rents. During the last two decades Namibia's natural resources have been exploited without reinvestments and the value of natural capital has declined. The extraction of resources is unsustainable as a result of poor investments to build national wealth (see Appendix 4).<sup>21</sup>

The Namibian economy is not energy-intensive, as it relies primarily on agriculture, fisheries and mining, without much secondary processing. However, energy, as an input to all productive facilities, influences production costs and thus the economic competitiveness of industry including the mining sector. Namibia is importing all liquid fuels (primarily diesel and petrol) and approximately 50% of the electrical energy consumed. Electrical energy provision is generally correlated to poverty alleviation and easing of gender imbalances.<sup>22</sup> However, expansion of the national electricity grid to remote areas with small electricity load requirements may not be economically attractive, why local power solutions are required. With improved living standards, increasing urbanisation and industrialisation, the energy demand is expected to increase. Energy use has significant environmental impacts, both local (e.g. indoor air-pollution, deforestation and land degradation) and global (e.g. increased greenhouse gas emissions). As southern Africa has already reached the point where demand for electricity is higher than the supply, Namibia is interested in developing new, domestic energy sources. Namibia has positive conditions for solar, biomass, and wind energy. Furthermore, the natural (fossil) gas reserves in the Kudu Fields<sup>23</sup> will be developed, and plans are underway to build a combined cycle power station near Oranjemund.

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<sup>18</sup> AfDB et al., 2007

<sup>19</sup> AfDB et al., 2007

<sup>20</sup> Natural resources contribute to 85% of the country export and 30% of GDP.

<sup>21</sup> Lange, 2004

<sup>22</sup> Ketlogetswe et al., 2006.

<sup>23</sup> Tullow Oil owns 70%, the Japanese firm Ituchu Corporation owns 20% and the Namibian government through state petroleum firm, NAMCOR, owns the remaining 10% of the Kudu gas fields. Tullow Oil is leading the gas field development. (U.S. Dept. of State, 2008)

The cost of long-term land degradation is estimated to N\$ 81 million per year, in terms of reduced output and resource availability. For the majority of the population depending on agriculture for its livelihood, land degradation often translates into lower incomes and food insecurity. Food demand exceeds supply in Namibia and imports of food from South Africa and Zambia fills this gap.<sup>24</sup> High imports of food make Namibia vulnerable to increasing global food prices and low global production, which could threaten food security in the country.

With an adult HIV prevalence (15-49 years) averaging 20% Namibia is one of the five most severely affected counties by HIV/AIDS in the world.<sup>25</sup> Beside the human aspects of HIV/AIDS, the economic and social costs of the epidemic are enormous. The virus contributes to aggravating poverty, unemployment and inequality. High morbidity and mortality of HIV/AIDS is weakening the capacities of individuals, households and communities as well as business, organisations and government to deliver essential services in health care, education and basic amenities. Decrease in capacities across society is weakening human, financial, and institutional safety nets and is leaving the country less able to respond to natural disasters and to manage the development process. The impact of HIV/AIDS on households, livelihoods, development capacity building, and every aspect of private and public life is, inevitably, also of major concern in the context of natural resource management.

### 2.3 Impacts on Public Health

Safe drinking water and sanitation is vital for good health, especially for people living with HIV and AIDS. Adequate nutrition, water supply and sanitation is of utmost importance, for HIV infected people to remain healthy and productive as long as possible and for people with AIDS to reduce their exposure to infections.<sup>26</sup> The water-supply coverage has improved significantly since 1990, and is now around 98% in urban areas and 81% in rural areas. Namibia is ahead of schedule in meeting the MDG on access to drinking water. Not much progress has been reported in sanitation, however; still only around 13% of the rural population has access to improved sanitation.<sup>27</sup> The gap between urban and rural households is wide; access to basic sanitation in urban areas is four times higher than in rural areas. Solid waste management is generally poor but also here is a significant difference between urban and rural areas; 65% in urban areas enjoy regular waste collection compared to 8% in rural areas. Lack of adequate sanitation and waste management affects the water quality. WHO estimates around 1000 annual deaths due to diarrhoea caused by polluted water/bad hygiene<sup>28</sup>, indoor and outdoor air pollution. In the table below figures from neighbouring countries are presented for comparison.

WHO estimates	Water Sanitation & Hygiene		Indoor air pollution		Outdoor air pollution	
Country	Diarrhoea deaths/year	Diarrhoea DALYs/100 0 capita per year	Deaths/year	DALYs/100 0 capita per year	Deaths/year	DALYs/100 0 capita per year

<sup>24</sup> AfDB et al., 2007

<sup>25</sup> WHO, 2005

<sup>26</sup> Wegelin-Schuringa et al, 2003

<sup>27</sup> AfDB et al., 2007.

<sup>28</sup> 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.

	year					
<b>Botswana</b>	300	6,6	200	2,6	<10	0,0
<b>Namibia</b>	<b>700</b>	<b>13</b>	<b>200</b>	<b>2,0</b>	<b>&lt;100</b>	<b>0,2</b>
<b>South Africa</b>	11 900	9	1 000	0,5	1 000	0,2
<b>Mozambiqu e</b>	26 900	47	9 700	16	900	0,6

Source: WHO

Health indicators such as maternal mortality have seen an increase due to the impact of HIV/AIDS. Life expectancy has fallen from 61 years (1991) to 49 years.

### 3. Climate change and Namibia

The Namibian economy is natural resource based and extremely sensitive to climate change effects. Even without the threat of climate change, Namibia is expecting absolute water scarcity by 2020. Climate change is likely to exacerbate the already dry conditions, especially in the central, inland areas. The water sector has been identified as the most vulnerable to climate change affecting the national economy significantly.<sup>29</sup> Climate change impacts will hit the poor hardest, with employment opportunities constrained and a substantial decline in wages, especially for unskilled labour.<sup>30</sup>

As a minor producer of greenhouse gases Namibia is placing more emphasis on vulnerability and adaptation to climate change rather than mitigation. Although Namibia has not taken a very active part in the international negotiations on climate change, Namibia commits to positions articulated in the Africa Group and G77+ China.<sup>31</sup>

#### 3.1 Expected impacts of climate change

Temperatures in Namibia have been increasing at three times the global mean temperature reported for the 20<sup>th</sup> century, and the temperature rise predicted for 2100 ranges from 2 to 6°C; evaporation is estimated to increase by 5% for each degree.<sup>32</sup> Changes in the hydrological cycles and impacts of climate change are more difficult to predict than changing temperature, and are subject to local differences and vast uncertainties. It is not obvious whether Namibian rainfall will be reduced, although intensity is likely to be increased. The frequency and intensity of extreme events (e.g. heat waves, drought and floods) is expected to increase, affecting water availability, reducing grazing distances and hydropower production, vegetation and land degradation, ecosystems and biodiversity, with negative impacts on poverty, economic development, health, and food production.<sup>33</sup> Furthermore, climate change may increase vector borne diseases.

If no adaptation measures are implemented, Namibia could face annual losses of up to 6% of the GDP due to the impact that climate change will have on its natural resources alone.<sup>34</sup>

<sup>29</sup> Govt. of Namibia, 2002; and Govt. of Namibia et al.(forthcoming).

<sup>30</sup> Incomes for unskilled labour could fall by 12-24% in order to absorb the new workers (Reid et al., 2007).

<sup>31</sup> These positions include that developing countries should not be burdened with binding emissions reduction targets, that financing of adaptation measures shall not be linked to the ratification of the Kyoto Protocol, and that funding for climate change adaptation should cover forest conservation, rehabilitation of degraded land and combating of desertification.

<sup>32</sup> Reid et al., 2007

<sup>33</sup> Boko et al., 2007 (IPCC); Reid et al., 2007 ; Govt of Namibia, 2002, and Govt of Namibia et al. (forthcoming).

<sup>34</sup> Reid et al., 2007. However, according to estimations by the Government of Namibia et al. (forthcoming), climate change impacts (without adaptation) would affect GDP in the range of 1-3%.

Besides obvious impacts on agricultural productivity and food production, other impacts could be a reduced flow in the Kunene river negatively affecting the Ruacana Hydropower plant, which in 2002 supplied almost half of Namibia's electricity needs. A predicted rise in sea level of 0.3 m could inundate significant parts of Walvis Bay, the main port.<sup>35</sup>

### **3.2 Response to climate change – adaptation**

There are strong links between poverty and climate change vulnerability. Vulnerability is a reflection of human capacity to cope with risks or shocks. Household income, income diversification, availability of labour and the health status of household members, as well as the existence of formal and informal social networks, are factors that determine vulnerability. A reasonably accurate indicator of a country's adaptive capacity is the HDI. Namibia is used to varying climate including periodic droughts (and occasional floods) and farmers have developed some adaptation options to cope with current variability. However, these adaptation measures are likely not sufficient for future climate change, especially not for the two thirds of the population that are subsistence farmers.<sup>36</sup> The low adaptation capacity is related to poverty, low education levels, and lack of possibilities to diversified household incomes.<sup>37</sup> According to the government of Namibia, it is important to address climate change from a developmental perspective. Adaptive responses include diversification options, management practices, improving the exercise of the best technical options as well as improving communication and information. Key adaptation priorities related to the water sector include continued attention to evaporation and improving efficiency of water resource use e.g. through improvement of water demand management practices; especially addressing the effectiveness of management in local authorities may go a long way to delay major water infrastructure investments. Improving the disaster risk preparedness (rather than disaster response) would strengthen management of the impacts of droughts and floods.<sup>38</sup> Adaptation projects include control of malaria and other climate-related diseases, dealing with sea level rise, testing of drought tolerant crops and heat resistant livestock breeds, public education programmes and water use efficiency measures.<sup>39</sup>

### **3.3 Response to climate change - mitigation**

The sectors emitting most greenhouse gases (GHG) in Namibia (1994) were agriculture/livestock (enteric fermentation in cattle and sheep) and transports. The industrial sector is small and most economic activities are not energy-intensive. Land use change and forestry are large CO<sub>2</sub> sinks, and Namibia as a whole is estimated to be a *net sink* for CO<sub>2</sub>. Knowledge on how to reduce emissions of GHG (especially methane gas) from livestock is currently limited but could include reducing livestock number, feed conversion or livestock methane vaccine. These options will not be further discussed here. The transport sector is the second largest GHG emitter in Namibia, due to fossil fuel combustion. The energy sector is facing the challenge to increase supply while at the same time take climate change mitigation aspects into consideration. The domestic energy sources available for Namibia are solar, biomass, wind, natural gas, uranium. Namibia has identified mitigation projects including improved energy systems, appropriate afforestation and agro-forestry projects, improved stoves and charcoal kilns, efficient lighting and solar water heating schemes and expanded rail infrastructures.<sup>40</sup>

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<sup>35</sup> Govt. of Namibia, 2002.

<sup>36</sup> Boko et al., 2007.

<sup>37</sup> Claus Hager, 28 April 2008.

<sup>38</sup> Govt. of Namibia, et al. (forthcoming).

<sup>39</sup> Govt. of Namibia, 2002.

<sup>40</sup> Govt. of Namibia, 2002.

Namibia has one of the highest solar radiation regimes in the world. Solar energy is increasingly used for off-grid electrification and two villages are using solely solar energy to cover their needs (with assistance from India). However, Solar photovoltaic (PV) technologies (converting sunlight to electricity) are still expensive and a number of energy analysts believe that PV should be confined to the few niches where it has proven to be cost-competitive and not be perceived as an important option for meeting the modern energy needs of Africa's rural population.<sup>41</sup> Instead, the potential for solar thermal installations (solar heat driving high-efficiency generators) is potentially large. Solar water heaters (SWH) are becoming increasingly popular and is used in 2.3% of formal housings. Although the sales of SWH have grown by 16% over the last 5 years, the bulk in use are bought by high-income households, institutions or large commercial establishments. The market remains too small for local manufacture to be viable in the short term.<sup>42</sup> Although the payback time for small scale SWH is not more than 3-5 years, *barriers to solar energy* adoption include high investment costs, and low electricity tariffs coupled with low awareness. Biomass include fuel wood, remains from forestry and agriculture, and biogas (including sewerage, slaughterhouse, and landfill generation, which are mitigating climate change through collecting methane gas). It is foreseen that a majority of Namibia's rural population will continue to rely on traditional cooking energy sources, why the country is piloting small-scale production of biomass efficient stoves.

Namibia has a potential for wind power, although it is assessed that even when assuming increasing electricity tariffs, grant financing has been needed to make the ongoing wind park at Luderlitz commercially viable. The wind park will produce a quarter of Namibia's electricity needs. Other options include exploitation of the Kudu natural gas fields, ocean waves, and uranium for nuclear power, although the two latter options are not advanced.

#### **4. What are Key Actors doing to manage the Environmental Problems?**

##### **Legislation and development policies**

The Namibian Constitution of 1990 states that an environmentally sustainable development is important and shall benefit the welfare of the people. Also the three main development policies: the Vision 2030, the five-year National Development Plans, and the Medium-Term Expenditure Framework (MTEF), integrate environmental issues. However, the coherence among these three documents is weak.

During the decade after independence, policy-development received a vast amount of attention, albeit related to the environment the policy and legislation has been moving slowly. Some policies and government Bills have not been taken through for approval, which is the case for i.a. Namibia's Policy to Combat Desertification and the Environmental Management Assessment Bill. Related to environment per se, the Nature Conservation Ordinance 1975 and its Nature Conservation Amendment Act (1996); and the Environmental Assessment Policy (1996) are important. The former sets the stage for Community Based Natural Resource Management on communally owned lands, and the latter established voluntary application of Environmental Impact Assessment. Legislation related to water include: the 1993 Water Supply and Sanitation Sector Policy (WASSP); the 2000 National Water Policy White Paper, which sets the policy and strategy for water resources management and water services; and

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<sup>41</sup> Karakezi, 2002.

<sup>42</sup> MME et al., 2005.

the Water Resources Management Act, which was adopted in 2004 but where implementation has not yet commenced. Related to agriculture, the National Agriculture Policy (NAP, 1995) aims at increasing and preserving agricultural productivity. Other relevant legislation include: the Namibian Drought Policy and Strategy (1997), National Land Policy (1988), National Resettlement Policy (2001), and the Poverty Reduction Strategy (1998). A list of Namibian national environmental legislation is detailed in Appendix 2. The White Paper on Energy Policy was adopted by Cabinet in 1998, and a National Strategy for Sustainable Use of Biomass Resources has been developed.

### **Key actors**

Government institutions related to the environment are the Ministry of Environment and Tourism (MET); Ministry of Agriculture, Water and Forestry (MAWF); the Ministry of Regional and Local Government, Housing and Rural Development (MRLGHRD) responsible for rural water supply; the Ministry of Health and Social Services (MHSS), responsible for sanitation; the Ministry of Land and Resettlements (MLR); the Ministry of Fisheries and Marine Resources (MFMR); and the Ministry of Mines and Energy (MME).<sup>43</sup>

State Owned Enterprises (SOEs), including NamPower and NamWater (provider of bulk water), play a dominant role in the economy.<sup>44</sup>

### **Environmental mainstreaming**

The prevailing aridity in Namibia is ensuring that at least some aspects of the environment are regularly mainstreamed into sector policies and legislation. A number of sectoral policies related to the environment and natural resources have been developed, but they have mainly a sectoral focus and are rarely known outside the specific ministry.<sup>45</sup> Climate change adaptation measures, focusing on e.g. land degradation, desertification, and vulnerability to extreme events, are partly integrated into national development policies, although under different headings.<sup>46</sup>

### **Gaps and overlaps**

There are several gaps or areas of conflict between ministries, e.g. related to water and sanitation where unclear mandates and responsibilities remain. Other challenges include non-coherence of objectives between different sector policies and legislation. An overall policy framework, integrating sectoral policies with respect to natural resources, the environment and its natural variability and change, is currently lacking. Moreover, no rural development policy exists. Furthermore, policies are not always interpreted taking into account Namibia's variable climate and the potential productivity from its arid environment. Conflicting statements are of concern, such as promoting a sustainable development while at the same time achieving increased agricultural and production levels higher than the population growth rate. Globalisation, evolving expectations and changing life styles of the population are also largely ignored in policy making.<sup>47</sup> In sum, there is uncertainty of the different authorities' responsibilities, and national development policies as well as sector policies lack coherence and integration.

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<sup>43</sup> EC, 2007; and DRFN, 2007.

<sup>44</sup> The ten largest SOEs had a total turnover equal to N\$ 4 357 million and recorded total profits equal to N\$ 46 million, compared to GDP of N\$ 38 400 million in 2005 (OECD, 2007).

<sup>45</sup> EC, 2007.

<sup>46</sup> Claus Hager, 28 April 2008.

<sup>47</sup> DRFN, 2007.

### **Other actors (donors, NGO's, etc.)**

Coordination of donor activities is done through the National Planning Commission; however donor coordination is rare and not institutionalised. The sector-compartmentalisation is strong with limited cross-sectoral communication and coordination.<sup>48</sup> Donor support to Namibia is declining due to its status as a middle-income country, and the current support is exclusively from EU. Previously a long-time partner in development, Sida is mainly giving support to Namibia through its regional programmes such as the Regional Water Initiative in Southern Africa based at the Embassy of Sweden in Maputo, and the HIV/AIDS Team based at the Embassy of Sweden in Lusaka.

Namibia has qualified for the US Millennium Challenge Account, and will receive USD 450 million over the next five years, for education, livestock, tourism, etc. There are some concerns in the donor community about the effective absorption capacity of such a significant flow of resources and that the Millennium Challenge Account could crowd out the activities of existing donors.<sup>49</sup>

The government of Namibia is giving priority to integrating Civil Society Organisation (CSO) in natural resources management and policy implementation, often with a focus on community participation and empowerment. These processes extend to encompass adaptation to climate variability and change.

Three policy research institutions have been established: the Namibian Economic Policy Research Unit (*inter alia* concerned with sustainable development); the Legal Assistance Centre (an NGO focusing on e.g. land reform); and the Institute of Public Policy Research (a non-profit organisation focusing on a wide-range of issues related to sustainable development).<sup>50</sup>

## **5. How and to what extent are the Responses to Environmental problems implemented and followed-up?**

### **Governance and implementation**

The regulatory reform in Namibia has generally been progressing slowly. For public utilities, monopoly is still the rule and Namibia does not have independent regulatory agencies (with some exceptions including Mines and Energy). Implementation of the NDPs has been primarily sectoral rather than integrated. Decentralisation, which is a stated objective of the government, has largely resulted in “responsibilities without resources”.<sup>51</sup>

Implementation of environmental policies is hampered by the missing approval of the Environment Management Assessment Bill, which gives the Ministry of Environment and Tourism/Department of Environmental Affairs (MET/DEA) the mandate for cross-sectoral coordination of environmental issues. Cross-sectoral environmental coordination is poor, which is a common theme for complaints by poor people; the lack of coordination denies people easy access to services, denies them information which they could use to improve their situation and contributes to added pressure they must place on the environment to sustain their livelihoods. *A key challenge is the national integration of planning and implementation*

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<sup>48</sup> EC, 2007.

<sup>49</sup> AfDB et al., 2007.

<sup>50</sup> DRFN, 2007.

<sup>51</sup> DRFN, 2007, page 10.

*efforts toward poverty reduction, toward emergency management including drought and toward overall sustainable development with environmental sustainability as a strategic element.*<sup>52</sup>

For urban water supply cost-recovery mechanisms have been introduced by NamWater, which has contributed to the improvement of water demand management. However, irrigation, livestock and mining are still subject to subsidies. In order to remedy the problems of these subsidies, which do not benefit the poor, a process started in 2005 to improve the transparent allocation of subsidies. Revenue collection is a problem for NamWater, due to local authorities' difficulties to collect payments from local users; in February 2005 the outstanding service accounts of local authorities were well over N\$ 400 million. To overcome the problems of non-payments, some towns have installed pre-payment water meters, but this has been heavily criticized by civil society organisations. One alternative strategy has been to set up communal-level water committees that collect money from different households; this has proved more successful. Low-income families with an income of less than N\$600/month cannot afford to use 6m<sup>3</sup>/month (baseline for an urban family of five). This leads to a vicious circle as non-payment of water use forces both local authorities and NamWater to increase tariffs, which makes services more unaffordable to the poor Namibians. In Windhoek and Rehoboth low-income households are subsidised to make baseline water consumption (40 litres/person/day) available at a lower price. Windhoek currently applies a rising block tariff, where the first 6 m<sup>3</sup> are provided at a subsidised rate. Above the baseline, water use is more expensive.<sup>53</sup> Non-revenue water accounts for a low share of NamWater resources, but losses are much higher for most municipalities (water losses in for example Rehoboth, which has been working extensively with Water Demand Management, is low but in seven Namibian towns non-revenue water exceeds 60%, which is very high).

Land reform is another area where progress has been slow. Access to agricultural land by Historically Disadvantaged Persons (HDIs) has been facilitated by the government, based on the 'willing seller, willing buyer' principle and supported by the National Resettlement Programme and the Agricultural Bank of Namibia's Affirmative Action Loan Scheme. Between 1990 and 2005, 4.5 million hectares (compared to the target 9.5 million hectares) or 12% of freehold land were redistributed, benefitting some 2 200 families. Since 2004 the state-led acquisition has been supplemented with expropriation of farms in the public interest. 25 farms have been identified and three farms have been acquired. The objective is to redistribute 15 million hectares by 2020. The Namibian government is considering ways to improve the land-reform programme, which has not only been slow but also had a negative impact on agricultural production. A Permanent Technical Team was created in 2003 to review the land reform process. Some recommendations include: improve the screening and selection of beneficiaries; involve civil society in the process; encourage community-driven resettlement; and favour farm workers.<sup>54</sup>

Namibia has started to build institutional capacity for adaptation to climate variability and change, including setting up the Namibian Climate Change Committee in 2001. The initial national communication to UNFCCC was submitted in July 2002, and the second national

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<sup>52</sup> EC, 2007; DRFN, 2007.

<sup>53</sup> Water use within the limits of the baseline of 6 m<sup>3</sup>/family/month is subsidised, while in the 6-36 m<sup>3</sup> range the tariff is based on a cost-recovery rate and above 36 m<sup>3</sup> the tariff is set at long-term marginal cost (OECD et al., 2007).

<sup>54</sup> DRFN, 2007.

communication on vulnerability and adaptation has been drafted (but not yet submitted).<sup>55</sup> In the second communication, the importance of addressing climate change from a development perspective is highlighted; i.e. adaptation capacity is closely linked to general development concerns including all dimensions of poverty.<sup>56</sup> As will all other sectors, capacity constraints for environmental and climate change related governance are enhanced by the HIV/AIDS pandemic.

Related to the energy sector, an Electricity Act has been drafted which put in place an electricity regulator to govern the industry. New power generating facilities such as the Kudu Gas Combined Cycle Power Plant is expected to increase the electricity tariffs (which may increase the financial viability of other renewable energy sources off-grid electricity production).

Namibia has introduced Natural Resource Accounts (NRA), which helps to evaluate the contribution of the environment to national wealth.<sup>57</sup>

### **International conventions and cooperation**

Namibia is party to a number of international environmental conventions including the Law of the Non-Navigational Uses of International Watercourses, the Ramsar convention, the UN Framework Convention for Climate Change (UNFCCC), Biodiversity and Desertification (for a detailed list of international conventions, see Appendix 3). Namibia is also a party to the SADC Protocol on Shared Watercourses, which has as an objective to foster integrated, equitable and efficient use of shared water resources in the region.<sup>58</sup> This is relevant to the development of water resources in Namibia, as all permanent sources of surface water are transboundary.

Namibia is supporting the Kimberley Process (KP)<sup>59</sup> and will assume the chair of the Kimberley Process Certificate Scheme in 2009.<sup>60</sup>

Bilateral funding to environmental projects and programs is declining and multilateral funding is becoming more common. In order to improve local ownership, projects should be endorsed by a national focal point, usually the Director of Department of Environmental Affairs. Current funding trends focus on business arrangements between developed and developing countries and on exchanges with established, recognised institutions such as universities. The future challenge for Namibia will be to find funding for innovation and funding for projects that have an affect ‘on the ground’.

Sida is currently supporting various regional water resources management programmes in Southern Africa relevant to Namibia including co-financing of the newly inaugurated Secretariat for the Permanent Okavango River Basin Water Commission, OKACOM, which is based in Maun (Botswana); the community development project ‘Every River has its People’ for the Okavango river basin; and development of a joint integrated water management strategy for the Zambezi river basin, all in which Namibia takes an active part.

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<sup>55</sup> Government of the Republic of Namibia, 2002; and Uazamo Kaura, 28 April 2008.

<sup>56</sup> Govt. of Namibia (forthcoming).

<sup>57</sup> Reid et al., 2007.

<sup>58</sup> SADC Revised Protocol on Shared Watercourses, 2003.

<sup>59</sup> The Kimberley process is an international diamond certification scheme designed to eliminate the trade in conflict diamonds.

<sup>60</sup> <http://allafrica.com/stories/200804160717.html>

Sida also plans to support a Water Demand Management project open for all countries in the SADC region, where Namibia could play an important role.

## **6. Implications for Sida**

Namibia is the most arid country in sub-Saharan Africa, and one of the countries in the world with the highest income inequality. A large share of the population lives in poverty or extreme poverty, although the country is classified as a low middle-income country. These two features (aridity and inequality) are heavily influencing the opportunities for sustainable development, as a majority of the poor people are subsistence farmers, who rely on natural resources for their livelihoods, vulnerable to environmental degradation, climate variability and change and with limited possibilities to enter into other economic sectors.

However, due to the fact that Namibia is a dry country with high reliance on natural resources for economic development some skills have accumulated that, with external support, perhaps could develop into comparative advantages for the country. Examples are water governance including water demand management, and natural resource accounting.

**Below are some tentative areas and issues for Sida to consider in the process of developing a selective cooperation strategy for Namibia. As the desk study has been very brief, the below issues are not comprehensive.**

### **6.1 Issues for Sida to consider related to climate change**

#### *Strategic development and planning*

- Today's decisions and investments in energy, industry, infrastructure, rural land use, etc. will largely determine the CO<sub>2</sub>-emissions of tomorrow. Improved spatial planning can both reduce future emissions and reduce vulnerability to climate change. Promoting inclusion of environmental and climate change aspects in spatial planning is therefore important and could be considered by Sida.
- The land reform process is crucial for more equitable land distribution, improved tenure security leading to i.a. higher investments rates, equitable land distribution and improved land management, which will – in turn – facilitate sustainable climate change adaptation especially at local levels. It might be worthwhile to investigate if support to a sound land tenure policy and support to the land reform process would be of interest to Namibia.
- When natural resources are exploited without reinvestment, the national wealth is decreasing and the development is unsustainable, and vice versa, if natural resource rents are reinvested the wealth of the nation will increase, which will facilitate adaptation to climate change. Botswana is doing this more successfully (see e.g. Appendix 4) and perhaps experiences from the neighbouring country could be of use. Support to develop a resource rent policy might be of interest for Sweden and Namibia?
- Namibia currently lacks an overall policy framework, integrating sectoral policies with respect to natural resources, the environment and its natural variability and change. Lack of integration could create sub-optimisations and prevent the fulfilment of goals. An integrated approach, on the other hand, would facilitate integration of climate change considerations into policy development and implementation. Sida may consider support to develop an overall policy framework or a rural development policy.

### *Water*

- Improved water resources management including continued attention to evaporation, water efficiency and water demand management is key to climate change adaptation in Namibia, and is often more cost effective than new supply-side investments..
  - Swedish local or regional authorities could twin with partner local authorities in Namibia and address the effectiveness of management in local authorities.
- Improving Namibia's disaster risk preparedness (rather than disaster response) would strengthen management of the impacts of droughts and floods and is identified as a climate change adaptation priority
  - The Swedish Rescue Services Agency may have experience and interest in this type of cooperation.

### *Energy*

- Namibia is currently investigating its domestic energy sources to meet the long-standing and pressing demands for a minimum level of modern energy services for the majority of the poor. Sida might want to consider supporting the efforts to develop a sustainable energy sector, by exploring new opportunities and overcoming some of the barriers identified including financial constraints and awareness raising (see section 3). Biogas (especially landfill methane-gas collection) is becoming increasingly interesting in the Botswana and might be interesting also for Namibia. It has a potential for supplying energy as well as being (potentially) eligible for Clean Development Mechanism (CDM) funding through its mitigation measures.
- Rural electrification is generally correlating to both poverty alleviation and easing of gender imbalances, and energy for cooking is gender related. Improved household economies will reduce households' vulnerability to stresses including climate change related impacts. Piloting renewal energy projects, e.g. small-scale solar and wind power for electricity or small-scale biomass options for cooking, could be interesting in a 'north-south' cooperation.

### *Information*

- Namibia's freedom of the press provides an opportunity to use media, perhaps especially radio, for public information, awareness raising, capacity building, and information sharing. This would be relevant to improve land-use management and agricultural practices as well as for disaster preparedness, enhancing both local adaptation capacity and mitigation of climate change..

## **6.2 Other issues for Sida to consider**

- Namibia has a spectacular nature and wild life, and (eco-) tourism could potentially increase without disturbances of the sensitive ecosystems when combined with community-based natural resources management. Examples show that converting agricultural land to natural reserves has provided plenty of job opportunities. However, it must be done in a pro-poor manner as the value of the land adjacent to national parks have increased significantly, which could affect the poor negatively.

- The service sector could be used to diversify the economy from natural resource dependency. Capacity development support could facilitate a development in the areas where Namibia has already commenced and that could be of interest to neighbouring countries, such as in Natural Resource Accounting, Water Demand Management and community-based (eco-) tourism.
  - Natural Resource Accounts are useful to compile occasionally and may provide valuable information especially related to resources-based sectors where the potential resource rents are large but where those rents are being dissipated at the moment due to poor policies.
  - Water Efficiency including Water Demand Management and Water Recycling has been implemented in some towns including Rehoboth and Windhoek; the skills are there but it is still limited to a few towns and a few persons. Namibia, with its increasing water scarcity, as well as neighbouring countries would benefit from developing these types of capacities and there is potentially a big demand for it regionally.

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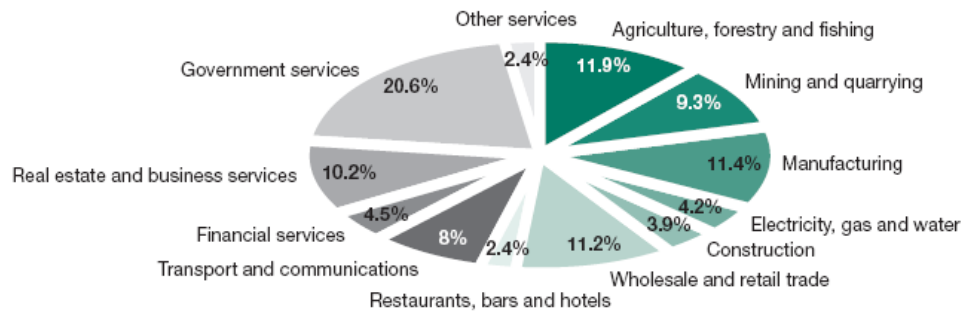
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## Appendix 1: Namibia GDP by sector in 2005

Figure 2 - GDP by Sector in 2005 (percentage)



Source: OECD et al., 2007

## Appendix 2: National environmental policy documents, statements and action plans

Source: EC, 2007.

	Policies/Laws	Year of Enactment
<b>A</b>	<b>Overall policies</b>	
	Namibia Vision 2030	2004
	The Poverty Reduction Strategy (NPC)	1998
	National Development Plan 2 (NDP) (NPC)	2001
<b>B</b>	<b>Environmental Management</b>	
	Environmental Management and Assessment Bill Act	1999 (draft)
	The National Environmental Policy	1993
	Environmental Assessment Policy (MET)	1995
	Environment Investment Fund of Namibia Act	2001
<b>C</b>	<b>Decentralization and Natural Resources Management</b>	
	Traditional Authorities Act	2000
	Decentralisation Policy (MRLGHRD)	1993, 1998
	Commencement of Decentralisation Enabling Act	2000
	Regional Councils Amendment Act	2000
	Local Authorities Amendment Act	2000
<b>D</b>	<b>Land Use and Management</b>	
	Agricultural Commercial Land Reform Act (MAWRD)	1995
	Regional Planning and Development Policy (NPC)	1997
	The National Land Policy (MLRR).	1998
	Communal Land Reform Act (MLRR)	2002
	Town and Regional Planners Act	1996
	National Resettlement Policy	2001
<b>E</b>	<b>Water and Irrigation</b>	
	Water Supply and Sanitation Sector Policy (MAWRD)	1993
	National Water Policy (MAWRD)	2000
	Wetland's Policy	Draft (2004)
	Water Resources Management Act	2004
	Namibia Water Corporation Act	1997
<b>F</b>	<b>Forestry</b>	
	The Forestry Act (MET)	2001
	Development Forestry Policy for Namibia	2001
<b>G</b>	<b>Energy</b>	
	White Paper on Energy (MME)	1998
	Electricity Act	2000
	<b>Fisheries</b>	
	Sea Fisheries Act	1992
	Walvis Bay and Off- shore Islands Act	1994
	Inland Fisheries Resources Act	2003
	Marine Resources Policy	2004
	Marine Resources Act	2000

	Territorial Sea and Exclusive Economic Zone of Namibia Act	1990
	National Fishing Corporation of Namibia Act	1991
	<b>Mining, petroleum</b>	
	Diamond Act	1999
	Minerals Development Fund of Namibia Act	1996
	Minerals Act	1992
	Petroleum Act	1991
	Petroleum Products and Energy Amendment Act	2000
	Minerals (Prospecting and Mining) Act	1992
	<b>National Parks, Wildlife and Tourism</b>	
	Wildlife Management, Utilization and Tourism in Communal Areas (MET)	1995
	Nature Conservation Act	1975
	Nature Conservation Amendment Act (MET)	1996
	Community-based Tourism Policy (MET)	1995
	Namibia Tourism Board Act	2000
	Parks and Wildlife Management Bill	Draft
	Regulations for the Sperrgebiet	Draft
	Game Products Trust Fund Act	1997
	Declaration and Regulation of Tourism Regulated Sectors	2004
	Namibia Wildlife Resorts Company Act	1998
	Wild Life Production and Utilisation Policy	
	<b>Waste Management and Sanitation</b>	
	Pollution Control and Waste Management Bill	draft
	National Environmental Health Policy	2002
	<b>Toxic substances and chemicals</b>	
	Prevention and Combating of pollution of sea by oil Act	1981
	Regulation on the import of ozone depleting substances (ODS) (MTI)	2004
	<b>Agriculture</b>	
	National Agricultural Policy (MAWRD)	1995
	Livestock Improvement Act (MAWRD)	1977
	Soil Conservation Act (MAWRD)	1969
	Food Security Policy (MAWRD)	1998
	Green plan	1992
	<b>Biological Resources</b>	
	National Biodiversity Strategy and Action Plan 2001 – 2010 (NBSAP)	2002
	Bill and Regulations of Access to Genetic Resources and the Protection of Associated Traditional Knowledge	draft
	<b>Disaster Management</b>	
	National Drought Policy and Strategy (MAWRD)	1997
	<b>Science &amp; Technology</b>	
	National Policy of Safe Use of Biotechnology	1999

### Appendix 3: International environmental conventions

Source: EC, 2007.

Convention/Protocol	signed	ratified
Convention on the Conservation of Antarctic Marine Living Resources, 1980	X	X
UN Convention on Law of the Sea (UNCLOS), 1983	X	X
Convention on the Law of the Non-Navigational Uses of International Watercourses, 1997	X	X
Convention on the Conservation and Management of Fishery Resources in the South East Atlantic Ocean (SEAFO), 2001	X	X
Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, 1995	X	X
Amendment to Article 6 and 7 of Protocol to amend the Convention on Wetlands of International Importance especially Waterfowl Habitat, 1987	X	
Memorandum of Understanding concerning Conservation Measures for Marine Turtles of the Atlantic Coast of Africa, 1999	X	
International Convention for the Conservation of Atlantic Tunas, 1966	X	X
International Convention for the Safety of Life at Sea, 1974	X	X
International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, 1969, as amended by the 1973 protocol	X	
International Convention on Civil Liability for Oil Pollution Damage, 1969, as replaced by the Protocol, as amended in 2000	X	X
Comprehensive Nuclear Test - Ban Treaty, 1996	X	X
Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction, 1993	X	X
Ramsar Convention (1971) Wetlands of international Importance, 1995	X	X
Protocol to Amend the Convention on Wetlands of International Importance Especially Waterfowl Habitat, 1982	X	
Trade in Endangered Species CITES (1990)	X	X
Amendment to Article XI of the Convention on International Trade in Endangered species of Wild Fauna and F flora, 22 June 1979	X	
Conservation of Migratory Species of Wild Animals (1983)	---	
Vienna Convention (Ozone depleting substances), 1993	X	X
Montreal Protocol on Substances that Deplete ozone Layer, 1987	X	X
Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, Adopted at the Fourth Meeting of the parties at Copenhagen on 25 November 1992	X	
Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, Adopted at the Second Meeting of the parties at London on 29 June 1990	X	
International Treaty on Plant Genetic Resources for Food and Agriculture, 2001	X	
Convention on Biological Diversity (1992)	X	X
Convention to Combat Desertification (1994)	X	X
UN Framework for Climate Change (1992)	X	X
Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal 1989	X	X
Hazardous Substances Ordinance 14 of 1974	X	
Persistent Organic Pesticides (POPs)	X	---
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, 1998	X	X
Cartagena Protocol on Biosafety to the Convention on Biological Diversity,	X	X

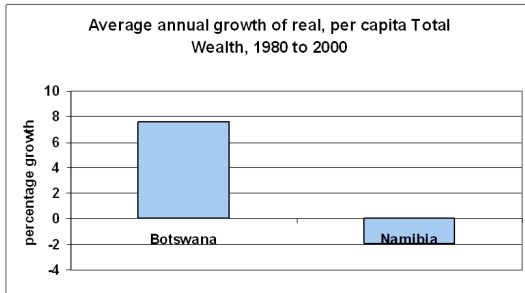
2000		
Kyoto Protocol	X	X
African Convention on the Conservation of Nature and Natural Resources, 2003	X	
Annex 16 to the Convention on International Civil Aviation, Environmental Protection, Volume 1-Aircraft Noise, Chicago,1944	X	
<b>regional</b>		
Agreement Amending the Treaty of the Southern African Development Community, 2001	X	X
Revised SADC protocol on Shared Watercourses, 2000	X	X
SADC Amendment Protocol on Trade, 2000	X	X
SADC Protocol on Wildlife Conservation and Law Enforcement, 1999	X	X
SADC Protocol on Fisheries, 2001	X	X
SADC protocol on Mining, 1997	X	X
SADC protocol on Energy, 1996	X	X
SADC Protocol on Forestry, 2002	X	X
SADC Protocol on Wildlife Conservation and Law Enforcement,1999	X	X
SADC Protocol on the Development of Tourism, 1998	X	X
The African Nuclear-Weapon-Free Zone Treaty, 1996	X	
Protocol on Shared Watercourse Systems in the Southern African Development Community (SADC) Region, 1995	X	X
Agreement between the Governments of Angola, the Republic of Botswana and the Republic of Namibia on the establishment of a Permanent Okavango River Basin Water Commission (OKACOM), 1994	X	
Agreement between the governments of the Republic of Botswana , the Kingdom of Lesotho, the Republic of Namibia and the Republic of South Africa on the establishment of the Orange-Sengu River Commission		
Agreement for the Establishment of Southern African Centre for Ivory Marketing (SACIM), 1991	X	
SADC Charter of the Regional Tourism Organisation of Southern Africa (RETOSA), 1997	X	X

## Appendix 4. 'National Wealth diagrams'

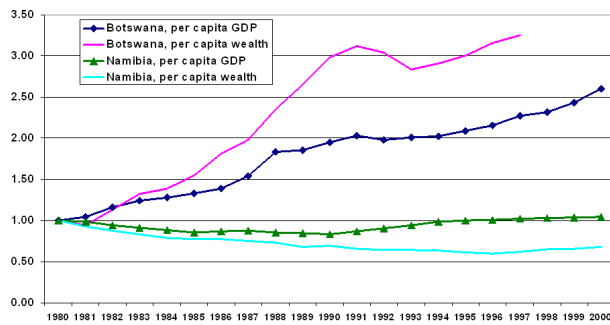
Source: Lange

### OUTCOME: Is GDP growth sustainable?

INDICATOR: Growth of Total Wealth



### Index of real, per capita GDP and wealth in Botswana and Namibia, 1980 - 2000



Per capita wealth in 1980 (in US\$):

Botswana: \$ 5,562

Namibia: \$10,414

### Distribution of water use, GDP & employment by industry in Namibia, 2001

