Review and Update of National Circumstances

Prepared by:

The Desert Research Foundation of Namibia

On behalf of:

The Ministry of Environment and Tourism

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FINAL REPORT
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Introduction and organisation of the report

This report presents the results of the Review and Update of Namibia’s National Circumstances and Infrastructural Support to Reduce Vulnerability to Climate Change. In short this study is referred to as “National Circumstances”. The review of National Circumstances was called for in 2008 by the Namibia Committee on Climate Change (NCCC) as part of a series of studies that were needed in preparation of the Second National Communication (SNC) on Climate Change for the United Nations Framework Convention on Climate Change (UNFCCC). This Convention has been ratified by Namibia in 1995 and as such Namibia became obligated to implement measures to mitigate the effects of climate change and to adapt to such changes. The preparation of the Second National Communication to the UNFCCC is one of the obligations of the Convention that Namibia has to fulfil. The SNC project is coordinated by the Ministry of Environment and Tourism (MET) on behalf of the NCCC.

Against this background the NCCC sought a consultant to review and update Namibia’s National Circumstances on Climate Change with linkages to the national development framework. The specific purpose was to update the National Circumstances chapter of the Initial National Communication. In the outline for the review of National Circumstances the NCCC however underscored that specific attention for the following tasks, themes and subjects was required:

1. A report on the Namibia’s vulnerability and its capacity to respond to impacts (of climate change) in relation to the country’s health sector.
2. Provide recommendations on incorporating a climate change component into the national strategy to reduce the incidence of malaria.
3. Investigate how to best involve different stakeholders and sectors of the economy in addressing the scarcity of water supply within the context of an ever-increasing demand.
4. Examine CBNRM programs and the tourism sector to determine their economic value and their contribution to awareness and possible reduction of environmental degradation through livelihood development and poverty alleviation for the rural population.
5. Conduct desk studies on the health situation with respect to HIV/AIDS and its effect on the human resources and skills required to prepare and implement adequate response measures which arise as a consequence of climate change.

Apart from attention to these topics, the aim of the review was to provide recommendations “on the suitability of the existing data as well as other data suitable for inclusion in Namibia’s second and subsequent national communications”. In addition it was requested to link “information provided on national circumstances with the information on impacts, vulnerability and adaptation to climate change” and to “provide linkages to national development issues, including NDP3, MDGs, the National Poverty Reduction Action Plan (NPRAP), national policy frameworks, CBNRM and HIV/AIDS”.

To address these information requirements the DRFN has organised this National Circumstances report in the following five sections:
1. **The impact of climate change on human health in Namibia.** This chapter first of all presents the climate change trends and predictions for Namibia and then elaborates the expected impacts of such changes on human health.

2. **Malaria and climate change in Namibia.** This section continues with the discussion of the implications of climate change for the spread of malaria in Namibia. It elaborates how malaria is managed in Namibia and then discusses ways to address climate change related impacts on malaria. It further provides recommendations for the national malaria-related policy framework, with more general inferences to the health sector at large. As such it links up with chapter 1 and these two chapters address point 1 and 2 of the NCCC’s requirements (as presented on the previous page).

3. **Climate change and water in Namibia.** This chapter, addressing point 3 of the NCCC’s requirements, first of all presents climatic information that is relevant to the water sector in Namibia and then briefly looks into implications of climate change for the water sector. Furthermore attention is paid to current and future demand for water in various sectors in Namibia, water resources management and mechanisms for stakeholder involvement. Finally, this chapter looks into technological, institutional and policy related matters that will be needed to match demand for water in the future with the supply of water in a sustainable manner.

4. **Tourism and CBNRM in Namibia.** This part of the study, covering the fourth of the requirements of the NCCC, intends to link the discussion of the benefits of CBNRM and tourism initiatives in Namibia to addressing the nation’s vulnerability to climate change. As such various benefits of tourism, conservancies and community forests are elaborated, before attention is focused on the potential contribution of CBNRM and tourism to climate change mitigation and adaptation in Namibia.

5. **The impact of HIV/AIDS on the capacity to respond to challenges in respect of national development and climate change.** This section of the report, addressing the final topic required by the NCCC, presents information on the current status of the HIV/AIDS epidemic in Namibia and elaborates impacts of HIV/AIDS on human resources and skills in various sectors in Namibia, including the agriculture, environment and health sectors. It also elaborates impacts on development goals such as food security, rural development and community based natural resource management. Thereafter progress and challenges in the national response to the HIV/AIDS pandemic are discussed, before conclusions are drawn on the linkages between climate change and HIV/AIDS and the capacity to respond to challenges brought about by climate change.

Due to the variety in the nature of the topics to be covered, the DRFN has moreover opted to consider each section of this study as a small report in itself. Apart from the variety of issues to be covered, this decision was informed by the requirement to present information on data collection and archiving for all topics. In line with this, each chapter towards the end provides information on data availability and data gaps, as well as some policy recommendations. To make matters more comprehensive, the references are also found in each separate section.
SECTION 1:
IMPACT OF CLIMATE CHANGE ON HUMAN HEALTH IN NAMIBIA

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1 Impact of climate change on human health in Namibia

This section presents a brief overview of the anticipated impacts that climate change is expected to have on human health in Namibia. The reader is cautioned that the section is not a medical study, but rather an assessment based on contemporary literature and statistics about climate change and health-related issues. The assessment is complemented by the opinions of a select group of Namibian climate and medical health experts.

1.1 Assessment method

To assess the impacts of climate change on human health in Namibia requires an understanding of the most likely physical effects and impacts that climate change will introduce. To this end, section 1.2 presents a brief overview of Namibia’s current health system. Section 1.3 below presents a brief review, identifying the major climate impacts of relevance to Namibia; the section is based on national and international literature on the likely changes expected as a result of climate change.

A changing physical climate has implications for human health. Section 1.4 below therefore asks the question what the climate impacts identified in section 1.3 will imply for human health in Namibia. The section focuses mainly on:

- temperature-related health impacts and effects
- water-borne and vector-borne diseases, as well as
- the health-related effects of food and water shortages.

Personal interviews with experts and key decision makers in Namibia’s health sector were used to identify the main issues likely to impact on Namibia’s health sector as the effects of climate change become more pronounced. In addition, Namibian health-related information was obtained from a variety of national sources, in particular the Namibian Demographic and Health Survey of 2006/07 (NDHS, 2008), Namibia’s Health Information System (HIS) and the Namibia National Health Accounts 2001/02 – 2006/07 (NNHA, 2008). All sources used in the present review are referenced in the text.

1.2 Namibia’s health system in a nutshell

Namibia’s health system aims to deliver health services to the Namibian populations based on the primary health care approach (MOHSS, 2006; PDNA, 200). To this end, the country’s health system is decentralized, which allows it to be and remain responsive to the needs of the population. The public health care system has been organised into functional directorates at the national and regional levels, and the provision of health services is shared between the public and the private sector. Namibia has four referral hospitals, 34 district hospitals, 37 health centres and 259 clinics under the public sector (PDNA, 2009).
Secondary and tertiary health care services provide an integral national system of referral support for primary health care services. The three intermediate/referral hospitals are Oshakati Hospital in the Oshana Region, Rundu Hospital in the Kavango Region, and Katutura Hospital in the Khomas Region. Windhoek Central Hospital serves as the overall national referral hospital. At an operational level, authority is decentralised to 13 regional management teams and their respective districts. The 13 regional directorates oversee service delivery in 34 health districts. The role of the district is to ensure efficient and effective implementation of the regionally directed programmes and projects (NDHA, 2008).

Public health services are provided through 30 public district hospitals, 44 health centres, and 265 clinics. Three intermediate hospitals and one national referral hospital provide support to these district hospitals. Because of the vastness of the country, the sparse distribution of the population, and lack of access to permanent health facilities in some communities, outreach (mobile clinic) services are provided at about 1,150 outreach points across the country (NDHA, 2008).

As public health services include diverse interventions, intersectoral collaboration has been recognised as an important aspect in health and social care delivery, and many partners play a role in this sector. Although the government is the main service provider, private and mission facilities continue to make important contributions, the latter are being subsidised by the government. Private sector participation is mainly focused on urban areas, providing health care through medium-sized hospitals, as well as through private pharmacies, doctors’ surgeries, and nursing homes (NDHS, 2008).

Child mortality in Namibia is consistently lower in urban areas than in rural areas (PDNA, 2009). However, general life expectancy has not improved, partly because of the HIV/AIDS epidemic. According to the Namibian Demographic and Health Survey of 2006/07 (NDHS, 2008), the infant mortality rate stands at 46 per 1,000 live births, while child mortality stands at 69 per 1,000 live births, which is counted among the lowest in sub-Saharan Africa. The maternal mortality ratio has been on the increase since the year 2000, from 225 per 100,000 live births in 1992, to 271 per 100,000 in 2000, and 449 per 100,000 in 2007. This increase is despite the fact that over 70% of births are delivered in hospitals (NDHS, 2008). Some 18% of women attending first pre-birth care services are under the age of 20 years, with teenage girls accounting for some 9% of Namibia’s total fertility rate (NDHS, 2008).

Adult mortality rates are higher for males than for females, and currently stand at 10 and 8 deaths per 1,000 population, respectively (NDHS, 2008). A comparison of mortality rates for the 2006-07 NDHS and the 2000 NDHS undertaken by the Ministry of Health and Social Services (MOHSS) shows an increase in adult mortality for both females and males: the summary measure of mortality for the age group 15 to 49 shows that – between the two surveys – female mortality doubled and male mortality increased by 65% (NDHS, 2008).

Household food insecurity among vulnerable female-headed households has been reported, and adequate nutrition therefore remains a concern. Malnutrition levels in children under the
age of five years are as high as 38% in some of the affected regions. According to the NDHS, the prevalence of acute malnutrition was 7.5% (NDHS, 2008).

Access to health care facilities, in terms of distance, time, and costs, can be a useful indicator of the quality of life of the population. Where health care services are available and within reach, people make use of such services for themselves and their family. Regarding the accessibility of government health facilities and services, rural households are more likely to be located nearest to a clinic than urban households (74% in contrast to 61%), and a health centre (9% and 4% respectively). On the other hand, urban households are more likely than rural households to be nearest to a government hospital (28% in contrast to 16% respectively) (NDHA, 2008).

The country has a relatively young population, with 43% of the total population under 15 years of age, and less than 4% of the total population over the age of 65. Despite rapid urbanisation, Namibia is still mainly rural, with approximately one in three persons living in urban areas. Overall, the population density is low (some 2 persons per square kilometre), but regional population densities vary substantially, with almost two-thirds of the population living in the four northern regions, and less than one-tenth living in the country’s south (NDHA, 2008).

According to the MOHSS Annual Report (MOHSS, 2006), the 10 leading causes of inpatient deaths in 2005/05 of all age groups is shown in Figure 1-1 below.

![Figure 1-1: Top ten inpatient causes of death for all ages in 2005/06 (MOHSS, 2006)](chart)

In view of the realities of Namibia’s health system, what are the likely changes and challenges that climate change will impose on it? And what measures will have to be taken to ensure that the national health system is adequately geared to meet the multitude of changes likely to happen in the next 50 years, including those imposed by an increasing population as well as the multitude of demographic and socio-economic changes, and changes in the
occurrence of diseases and effectiveness of treatments? Of greatest interest in the context of this report will be the question how climate change will impact on the nation’s health system. The next few sections will elaborate on the most important impacts that climate change is likely to exert on Namibia’s health system.

1.3 Climate change impacts on Namibia

This section addresses the following question: what are the most important climate change-related impacts of relevance to human health in Namibia, and when are they likely to occur? The present section is mainly based on reports by the Intergovernmental Panel on Climate Change (IPCC), specifically their 4th Assessment Report (IPCC, 2007), as well as a recent report on the local impacts of climate change undertaken by the Desert Research Foundation of Namibia and the Climate Systems Analysis Group of the University of Cape Town, i.e. the Climate Change Vulnerability and Adaptation Assessment Report Namibia (DRFN, 2008).

The IPCC report uses the results of 23 atmosphere—ocean general circulation models (GCM) to formulate predictions about likely future climate change (IPCC, 2007). The assessment uses six distinct future greenhouse gas (GHG) emission scenarios to model the impact that the different GHG emission trajectories will have on the world’s climate. It is noted that some recent literature suggests that global carbon dioxide (CO2) emissions are rising faster than the most dire ones used under the IPCC emission scenarios (Pielke et al, 2008), and some leading climate scientists have raised concern that the IPCC’s predictions are still too conservative (see for example Rahmstorf, 2007; and Hansen et al, 2008).

The Climate Change Vulnerability and Adaptation Assessment (DRFN, 2008) uses global circulation models (GCMs), i.e. computer models which represent the interactions between the land surface, the atmosphere and the oceans, to formulate projections for temperature and wind regimes in the period 2046 to 2065. In addition, they also use downscaled global circulation models (DGCMs) to project the effects of climate change on rainfall for the period 2046 to 2065. When GCMs are downscaled, they allow the large-scale GCM models to be used for projections at more local (spatially limited) scales.

It should be noted that the assessment used several DGCMs to make rainfall projections, which resulted in a range of future climate scenarios. This is important as no single DGCM is considered absolutely superior to all others, and all DGCMs in use for southern Africa have a variety of predictive weaknesses. Also, a similar family of GCMs were used for temperature and wind projections. By using a number DGCMs / GCMs, which are all underpinned by different base-assumptions and model characteristics, climate trends rather than precise

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1 Downscaling is a method that derives local-to-regional-scale (10 to 100 km) information from larger-scale models or data analyses. The statistical method used in the study relies on developing statistical relationships that link the large-scale atmospheric variables with local/regional climate variables. The quality of the downscaled product depends on the quality of the driving – or underlying – model.
climate predictions become apparent. The discussion in the remainder of this section is therefore based on the trends shown by the various DGCMs (for rainfall) and GCMs (for temperature and wind).

### 1.3.1 Changes in temperature

The IPCC report states that global mean surface temperatures could rise between 1.1°C and 6.4°C by the year 2100, with best estimates lying in the range between 1.8°C and 4.0°C (IPCC, 2007; IPCC, 2007b). Most variation, especially in the latter two-thirds of this century, is due to the uncertainties related to future technology choices and associated emissions of greenhouse gases made in years to come. Here, the absolute amount of carbon dioxide and other GHGs that will be emitted by industrialised as well as developing countries, as well as the uncertainty related to behaviour changes by nations and the society at large, will play a very significant role and determine the degree of atmospheric warming in years to come (IPCC, 2007b).

The Climate Change Vulnerability and Adaptation Assessment (DRFN, 2008) uses 13 GCMs to make projections of changes in temperature. As shown in Figure 1-2 below, these are presented as the minimum, mean and maximum future change in surface air temperatures for the summer period (January to March) in the years 2046 to 2065. Figure 1-3 below shows the projections for the winter period (July to September) (DRFN, 2008).

![Figure 1-2: Projected increases in mean surface air temperature (in °C) in summer (January to March), minimum (left), mean (middle) and maximum (right) projected change based on 13 GCMs (DRFN, 2008).](image)

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2 The assessment uses the 13 GCMs taken from the World Climate Research Programme's Coupled Model Intercomparison Project phase 3 multi-model dataset (DRFN, 2008).
Of note is that the predicted change in temperatures is small at the coast, and increases further inland during all seasons. The projected increases of minimum temperatures during the summer months lie between 1°C to 2°C, while maximum temperature values are predicted to increase between 2°C and 3.5°C. Maximum projected increases in temperature are slightly higher during winter (2.5°C to 4°C), while the projected increases in minimum temperatures are similar to those during summer (1°C to 2°C).

Figure 1-3: Projected increases in mean surface air temperature (in °C) in winter (July to September), minimum (left), mean (middle) and maximum (right) projected change derived from 13 GCMs (DRFN, 2008).

### 1.3.2 Changes in rainfall

Rainfall is a local phenomenon, and the IPCC’s assessment report provides little specific information on the expected rainfall changes of direct relevance to Namibia (IPCC, 2007; IPCC, 2007b). The study by the DRFN however is more specific: Figure 1-4 below shows the projected median in total monthly rainfall change from 6 statistically downscaled GCM rainfall estimates for the years 2046 to 2065 (DRFN, 2008). Those regions where 3 such downscaled GCMs (50%) indicate wetting and 3 models indicate drying are left blank, as are regions which show increases of less than 10 mm of rainfall per month (which is equal to the expected increase in evapo-transpiration). As indicated above, the precise quantification of the magnitude of change remains a greater challenge than predicting the direction or trend of the changing rainfall pattern.

By mid century, i.e. in the period 2046 to 2065, the various downscaled climate models most consistently show an increase in late summer rainfall over major parts of Namibia, and a decrease in winter rainfall in the country’s south and west. Increases in rainfall are most obvious during January to April, especially in the central and north-eastern regions. It is noted that predictions about the Cuvelai area – where some of the more recent flooding occurred – remain inconclusive.
Figure 1-4: Mid-century (years 2046 to 2065) rainfall projections showing the median change in total monthly rainfall (mm per month) from 6 statistically downscaled GCMs, with blue indicating increases and orange indicating decreases in rainfall. Regions where 3 such models indicate drying while the other 3 show wetting, as well as those regions experiencing increases of less than 10 mm per month (i.e. less than the expected increases in evapo-transpiration) are indicated in white (DRFN, 2008).
A decrease of rainfall in the country’s south-west is suggested for most months, except for February and March, but such decreases are particularly widespread during the main winter months, which are traditionally the most important rainfall months.

The projected changes in rainfall are consistent with the contemporary understanding of how climate change will manifest itself over the southern African region and are captured in regional climate models, especially in that:

- increases in thermal heating, coupled with increases in atmospheric moisture, especially during mid to late summer, will increase convective rainfall over much of the country, and that
- winter rainfall is reduced in the southern and especially south-western parts of the continent, and by implication, southern Namibia (DRFN, 2008).

### 1.3.3 Changes in surface wind

As noted in section 1.3.2 above, the IPCC assessment report is less valuable in cases where location-specific projections are required (IPCC, 2007; IPCC, 2007b). Here, the DRFN assessment provides more specific information: Figure 1-5 below shows the minimum, mean and maximum expected changes in surface winds in the summer period in mid-century (years 2046 to 2065), which are derived from 13 GCMs (DRFN, 2008). It is noted that minimum changes are mostly around zero, whereas maximum changes are for onshore flow from the south-west, which are highest (approximately 0.8 m/s) towards the south. Mean changes show a similar pattern, even though these are of smaller magnitude to the maximum changes, and are consistent with increased convective activity and an associated low-pressure trough over the continent during summer.

![Figure 1-5: Projected changes of surface winds in summer (January to March), showing minimum (left), mean (middle) and maximum (right) changes, as derived from 13 GCMs (DRFN, 2008).](image)

Figure 1-6 below shows the minimum, mean and maximum expected changes in surface winds in the winter period in mid-century (years 2046 to 2065), again derived from 13 GCMs (DRFN, 2008). It is noted that both the mean and maximum wind changes predicted to occur during winter indicate a similar pattern of change to those projected for summer. However,
the minimum projected change also indicates increases in winds from the south-east over the ocean towards the south. Both the maximum and mean projected changes indicate increases in the southerly component of winds over the ocean. These projected changes are consistent with a retreat of mid-latitude storms (which normally bring north-westerly winds) towards the south, and an increase in the south Atlantic high-pressure system, which drives winds from the south.

Figure 1-6: Projected changes of surface winds in winter (July to September), showing minimum (left), mean (middle) and maximum (right) changes, as derived from 13 GCMs (DRFN, 2008).

1.3.4 **Historical climate change trends**

Namibia’s climate trends since 1960 show noticeable changes in weather extremes as well as rainfall seasonality (DRFN, 2008). Such changes are specifically seen as:

- an increase in maximum temperature values
- an increase in the frequency of days with temperatures above 25°C, and 35°C respectively
- a decrease in minimum temperature values
- a decrease in the frequency of days with minimum temperatures below 5°C
- an increased length of the dry season
- a decrease in the number of consecutive wet days, with
- an associated later start and earlier cessation of the rainy season, specifically in northern Namibia (DRFN, 2008).

The observed changes in temperature extremes, the length of the dry season, as well as the rainfall intensity all underscore that the climate in Namibia tends to become drier. However, the observations also highlight that climate variability is as significant a phenomenon as the long-term climate trends. This implies that Namibia’s climate variability is likely to remain a key characteristic of the country’s future climate, which also has important implications for health and health-related issues in Namibia.
1.3.5 Summary of the main climate change predictions for Namibia

This sub-section synthesises the main climate change predictions for Namibia for the period 2046 to 2065, focusing on those physical variables that may become important drivers or have significant effects on human health, and therefore Namibia’s health sector.

1.3.5.1 Climate variability

Year-on-year climate variability is likely to have a most significant impact on Namibia. This realisation is of significance when formulating appropriate health-related responses, especially as the number and intensity of extreme weather events increases. It is expected that local climate variability will, in some cases, offset the changes introduced by longer-term climate trends: for example, increasing rainfall intensity could offset a shortening of the rainy season. Such offsets though cannot as yet be quantified to an acceptable degree of accuracy, but will have to be kept in mind when making location-specific forecasts and/or formulating location-specific responses.

1.3.5.2 Rainfall

By mid-century, summer months are expected to see an increase in rainfall over much of the country, most significantly during January to April, and particularly in the central and northern regions. In winter, drying will occur in south-western Namibia, and will be most prominent during mid-winter months. Individual rainfall events are expected to become more intense and pronounced, especially in late summer, while rainfall seasons are likely to be shorter.

1.3.5.3 Temperature

By mid-century, summer months are expected to see minimum projected temperature increases of between 1°C and 2°C across the country, and maximum projected temperature increases of between 2°C and 3.5°C. In winter, minimum projected temperature increases are expected to range between 1°C and 2°C across the country, while maximum projected temperature increases are expected to range between 2.5°C and 4°C.

1.3.5.4 Wind

An increase of wind speeds is predicted, as both the thermal and mid-Atlantic drivers are expected to become more pronounced.

1.4 Health-related impacts of climate change in Namibia

This section addresses the following question: what are the most important health-related effects and impacts expected due to a changing climate in Namibia? As indicated in section 1.3 above, global climate change is expected to lead to an increase in surface air temperatures, an increase in the intensity of (late summer) rainfall events, a lengthened dry
In the season, an increase in the general climatic variability, an increase in the evapo-transpiration rates of plants, as well as an increase in wind speeds. These external variables, both individually and cumulatively, are expected to affect human health, and have an impact on human health-related aspects, principally through a complex set of interdependent interactions (WHO, 2003). Such impacts on human health can best be understood when considering the effect that past regional and local changes in short-term weather events have had on humans and human health.

Changes in temperature, precipitation and extreme weather events are expected to lead to short- and long-term changes in the physical environment, many of which will have a direct as well as indirect impact on human health. For example, recent floods in northern Namibia have been linked to outbreaks of cholera, while the devastating effect that humans suffer as a result of drought are well-known in Namibia. In this way, climate change is expected to add additional pressures to the social environment that is, in many cases, already burdened by poverty and health challenges such as the HIV/AIDS pandemic, tuberculosis, malaria, malnutrition and others (IPCC, 2007b; WHO, 2003).

Many of Namibia’s environmental niches, currently offering livelihood opportunities to people, have little or no adaptive capacity. Yet, a considerable number of Namibians depend on such niches, for example as subsistence farmers, or by relying on the availability of (mostly) free ecosystem services. These life-supporting systems all have physical limits, and generally require lengthy timeframes to adapt to changing external pressures, such as the effects of climate change and/or human-induced impacts, or both. Change in general, whether climate induced or of other nature, is of particular concern when dealing with communities that are already weakened by poverty, malnutrition and/or the effects of systemic sicknesses and high disease burden. It is concluded that the effects of climate change, and particularly the effect of increased climatic variability, will increase the pressure on human health and health-related aspects, and lead to an increase in the overall disease burden in most communities in Namibia. Such impacts are also likely to result in new and often unexpected challenges for the Namibian public health sector that is already stretched to capacity. And, the country’s health system is expected to be amongst the first witnesses to receive those individuals who have been affected by a changing climate.

It should be noted that some of the physical manifestations of climate change discussed in section 1.3 above may have positive effects on human health, for example those related to a reduction in diseases associated with cold weather. Other manifestations, such as an increase in rainfall variability, are most likely to have an overall negative impact on human health. For example, the effect of a changing climate on food crops is likely to lead to a reduction in food security, which in turn has important negative flow-on effects on malnutrition. Globally, the burden of disease and premature death related to a changing climate is expected to increase (WHO, 2003). It is concluded that climate change is not just a critical environmental issue, but is likely to be a significant health-impacting issue for humans. The following sub-sections discuss the expected health impacts that a changing climate is likely to bring about in more detail.
1.4.1 Increasing temperatures

This sub-section focuses on the question: what are the human health impacts related to an increase in minimum, mean and maximum surface air temperatures? It is well-documented that an increase in average and/or maximum and minimum temperatures has immediate health implications: to illustrate, the heat waves of 2003 in Europe caused up to 70,000 deaths, caused mainly from respiratory and cardiovascular diseases (Robine et al, 2008). Similarly, the California heat wave of 2006 showed large increases in admissions to hospitals related to cardiovascular and other illnesses (Knowlton et al, 2009).

Rising temperatures are also likely to generate heat-related stress, which can increase the mortality rate due to heatstroke, and lead to added vulnerability of new-borns, as well as the old and infirm (McMichael et al, 2008). In developed countries, urban populations are expected to be more adversely affected than rural ones, and people with a pre-existing respiratory disease and/or other systemic disease burden are particularly vulnerable (Ayres et al, 2009). In Namibia however, a significant proportion of rural dwellers have less access to medical services than their urban compatriots, and are therefore considered relatively more vulnerable to the effects of heat stress.

In cases of pre-existing medical conditions and/or extreme levels of poverty, existing vulnerabilities are likely to be worsened by climate change in general, and an increase in temperatures in particular. Increasing incidences of heat stress, increased dehydration, and a reduction of the ability to cope with other stressors and/or diseases are likely to be the main effects that Namibians will suffer due to an increase in future temperatures.

Additional secondary effects on human health, caused by increases in temperatures, are likely to include:

- increased water stress as a result of increasing water scarcity
- decreased crop yields
- increased malnutrition
- lower air quality (mainly in urban settings), and
- a generally increasing additional disease burden.

These aspects will be discussed in further detail below.

1.4.2 Increasing water and vector borne diseases

The effects of climate change are very likely to result in increased pressure on open water resources (IPCC, 2008; IPCC, 2007; IPCC, 2007b; WHO, 2003). This is of particular significance in northern Namibia where open water sources are used for livestock watering, and to meet human water needs. The contamination of such water sources, especially as a result of increasing pressures (between communities, and between humans and the animals they depend on) to use such resources, is very likely (IPCC, 2008). The contamination of water resources may include human and animal faeces, which may in turn cause diarrhoea, cholera, fever and related illnesses (WHO, 2003).
Communities with pre-existing disease burdens are particularly vulnerable to water borne diseases. Increased water stress will also impact on food security: crop yields are likely to be reduced as temperatures increase, leading to malnutrition and the increased vulnerability to water and vector-borne diseases. The health of domesticated animals is also likely to be affected, leading to reduced fertility, lower calving rates, while reductions of milk and meat yields are likely. A deterioration of animal health will have flow-on effects on those humans who are dependent on such animals and their products (IPCC, 2008), and increase their susceptibility to existing and new diseases.

Rising temperatures are also likely to lead to an increased frequency, greater spread and increased transmission rates of infectious vector borne diseases (Husain et al, 2008). In particular, it is recognised that temperature is the single most important physical variable that affects the rate of pathogen maturation and replication within mosquitoes (Yé et al, 2007). It was found that mosquito abundance is amplified with warming, and east African mosquito populations were found to increase by more than ten-fold with every 0.1°C increase in temperature (Pascual et al, 2006). As discussed, Namibia can expect across-the-board increases in minimum, mean and maximum temperatures. This effect in itself will imply that the population densities of such insects are likely to significantly increase.

Rainfall patterns will change as a consequence of climate change, leading to shorter more intense rainy periods. Intense rainfall events cause an increase in water runoff, and enhance the opportunities of the formation of open waters, sometimes in areas that have not previously experienced such occurrences. This implies that the prevalence of water- and vector-borne diseases and of insects benefitting from more abundant open water sources is likely to increase as the number of suitable breeding areas increases. For example, areas that have previously offered only marginal opportunities for mosquito breeding will now, as a consequence of prevailing temperature regimes and/or the availability of water, offer more permanent breeding opportunities. An increase in the burden of water-borne diseases in particular is more likely in areas experiencing flash-floods and/or an increase in competition for water resources. This implies that both flood and drought conditions will likely increase the burden from water-borne diseases.

For Namibia, vector reproduction rates, parasite development cycles and bite frequencies are expected to increase with rising surface air and water temperatures. Population increases of mosquitoes and ticks (for example those responsible for tick-borne encephalitis) are likely to become increasingly widespread, and may in time reach major population centres that have been spared of such infestation in the past. Populations who have had little or no exposure to malaria-carrying mosquitoes will find themselves at an increased risk. The question of climate change and malaria is discussed in greater detail in chapter 2 of this report.

On the other hand, climate impacts on Namibia also foreshadow that the rainy season will be shortened, and that rainfall episodes are likely to become more intense. For existing mosquito breeding areas, for example, an increase in the frequency and/or severity of heavy rains is projected. Here it can be expected that the natural egg laying and larvae breeding cycles will be disrupted by such intense weather events, and cause a decline in vector populations. The
above illustrates that it is not entirely trivial to attribute the incidence and dynamics of illnesses to climate change, and it is very likely that other important local and national parameters exist that have an equal weight in determining the rate and spread of old and new epidemics (Reiter et al, 2004; Reiter, 2008). This aspect as it pertains to malaria and its likely dynamics as a result of a changing climate is discussed in more detail in chapter 2.

Generally, it is likely that without an added focus on health and health-related developments, urban centres in particular will find themselves increasingly exposed to new or intensified disease burdens, which are promoted as a consequence of the direct and indirect impacts that climate change will bring to Namibia. If this is to happen, the Namibian health system will be exposed to new challenges, which could include an increase in local or even national epidemics, and a variety of small- and larger-scale outbreaks of human diseases, all of which will impose added demands on the existing health infrastructure.

**1.4.3 Decreasing crop yields and food security**

It has not yet been conclusively investigated how climate change will impact on the availability, affordability and accessibility of food in Namibia. The Climate Change Vulnerability and Adaptation Assessment (DRFN, 2008) too was inconclusive about the net effects of climate change on mahangu and maize yields in Namibia.

However, indirect evidence of the large-scale effects that climate change is likely to have on food security can be gleaned from those years in which floods or droughts have disrupted the more normal climatic patterns, both in Namibia and elsewhere in Africa (IPCC, 2007). For as long as humans have lived in Namibia, its weather patterns have been highly variable. The occurrence of above- or below-average rainy seasons is accepted reality, but despite this acceptance in the national psyche, every drought and flood event still causes considerable social and economic harm (IIED, 2007).

In view of demographic changes, brought about by Namibia’s historical labour regime, the traditional roles of women particularly in rural populations, the high prevalence of HIV/AIDS and other factors, the availability of food in rural Namibia in particular is most likely to be adversely affected by climate change. Higher temperatures, greater climatic variability, shorter rainy seasons and a longer duration of the dry season are all going to contribute to reduce crop yields, and a larger total population is expected to place traditional food supplies under increased pressure (IPCC, 2007b). This effect is also expected to increase the risk of household food security, and an increase in malnutrition is likely. It is well-documented that malnutrition weakens human disease defences, and increases mortality in the general population, with vulnerable groups such as infants and children under the age of 5 years being particularly exposed (WHO, 2003; Brown et al, 2008; Brown, 2009).

The flow-on effects of human malnutrition in general are also well-documented, and include chronic and acute child malnutrition, low birth weights, suboptimal breastfeeding, and increased disintegration of traditional community and family cohesion. These effects may
also increase the rate at which community and/or family members decide to migrate, in search of more secure food resources (Black et al, 2008).

Climate change is expected to compound existing food insecurity (Cohen et al, 2008). The recent international scramble for agricultural land for biofuels has illustrated what may happen if large-scale tracts of land that have previously been used for traditional food supplies become unavailable. Already, millions of people in sub-Saharan Africa have calorie-deficient diets, and a further weakening or disruption of the food chain – irrespective of whether it is climate-induced or otherwise – will increase malnutrition and decrease food security (ActionAid, 2008).

Contemporary research suggests that southern Africa, without sufficient adaptation measures, is likely to suffer crop reduction and an overall decrease in food crops, such as maize, millet and sorghum (Lobell et al, 2008). Food-related impacts of climate change are not limited to Africa, and one study finds that half of the world's population could face severe food shortages by the end of the century, because rising temperatures reduce crop yields (Battisti et al, 2009). This is a most significant statement, as food scarcity can destabilise political systems, threaten world peace, and increase hunger, illness and death due to under-nutrition (Brown, 2009).

The increased occurrence of extreme weather events, including droughts and floods, and changing patterns of plant and livestock diseases as well as pest infestations, are likely to lead to a reduction of income from animal products, a decrease of crop yields, an increase in the risk of fire, and an associated loss of income from forests. These factors will negatively affect food production in general, and lead to a decrease in food security. Namibia’s vulnerable populations, which are traditionally found in rural areas, are the most likely ones to be adversely affected by such changes, and are also probably facing an increased disease burden associated with greater food insecurity (DRFN, 2008).

A rise in international food prices, driven by climate change-induced food scarcity, is likely to increase the number of migrants to urban centres, and will increase food insecurity of both urban and rural populations. Namibian towns and cities are already witnessing increased migration and net inflow of new arrivals, many of whom then find themselves in un-serviced and/or over-populated informal areas. Unless specific measures are taken, this trend is most likely going to increase, as food-related insecurity of subsistence farmers grows as a consequence of a more variable climate, and the associated deterioration of land and animal resources. This sentiment is also echoed in a recent statement by the World Food Programme that summarises that “in the fight against hunger we could now be facing a perfect storm of challenges, including climate change and increasingly severe droughts and floods, soaring food prices and the tightest supplies in recent history, declining levels of food aid, and HIV/AIDS, which also aggravates food insecurity” (Sheeran, 2008).

However, a discussion of the effects of climate change on crop yields and food security should not end in a mere doomsday scenario. It is important to note that some climate-related effects on food stocks can be ameliorated by applying enhanced management practices. In
addition, promoting water-efficient crops, more heat and drought tolerant plant and animal species, and switching to more adapted plant and animals in the agricultural sector can offset many of the negative repercussions that climate change is likely to exert. Adaptation to climate change, for example by changing agricultural practices, crops and/or animal species is possible, and may be the most cost-effective way to ensure continued food production on the land, while also being the best guarantor for ensuring that rural people have meaningful livelihood opportunities.

The introduction of large-scale adaptation techniques and practices in Namibia requires a deliberate and well-funded effort by all stakeholders, which in turn renders this a financial, informational and social challenge. We conclude with a recent statement from the World Agriculture Report: “to address expected climate change challenges and impacts, a major role for agricultural knowledge, science and technology is to increase the adaptive capacity and enhance resilience through purposeful biodiversity management. Options include irrigation management, water harvesting and conservation technologies, diversification of agriculture systems, the protection of agro-biodiversity and screening germplasm for tolerance to climate change” (IAASTD, 2008).

1.4.4 Increasing water scarcity

Easy access to safe and reliable water, and good sanitation, are essential for human health. The IPCC’s 6th Technical Paper is devoted to the topic of climate change and water (IPCC, 2008), and their most important statements of immediate relevance to Namibia include:

- Observed warming over several decades has been linked to changes in the large-scale hydrological cycle, such as increasing atmospheric water vapour content, changing precipitation patterns, intensity and extremes, and changes in soil moisture and runoff.
- Precipitation changes show substantial spatial and inter-decadal variability.
- Globally, the area of land classified as very dry has more than doubled since the 1970s.
- Climate model simulations for the 21st century are consistent in projecting precipitation increases in high latitudes and parts of the tropics, and decreases in some subtropical and lower mid-latitude regions. Outside these areas, the sign and magnitude of projected changes varies between models, leading to substantial uncertainty in precipitation projections. Thus projections of future precipitation changes are more robust for some regions than for others. Projections become less consistent between models as spatial scales decrease.
- By the middle of the 21st century, annual average river runoff and water availability are projected to decrease over some dry regions at mid-latitudes and in the dry tropics. Many semi-arid and arid areas (including southern Africa) are particularly exposed to the impacts of climate change and are projected to suffer a decrease of water resources due to climate change.
- Increased precipitation intensity and variability are projected to increase the risks of flooding and drought in many areas.
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- Higher water temperatures and changes in extremes, including floods and droughts, are projected to affect water quality and exacerbate many forms of water pollution.
- Globally, the negative impacts of future climate change on freshwater systems are expected to outweigh the benefits.
- Changes in water quantity and quality due to climate change are expected to affect food availability, stability, access and utilisation. This is expected to lead to decreased food security and increased vulnerability of poor rural farmers, especially in the arid and semi-arid tropics.
- Climate change affects the function and operation of existing water infrastructure – including hydropower, structural flood defences, and drainage and irrigation systems – as well as water management practices.
- Current water management practices may not be robust enough to cope with the impacts of climate change on water supply reliability, flood risk, health, agriculture, energy and aquatic ecosystems.
- Climate change challenges the traditional assumption that past hydrological experience provides a good guide to future conditions.
- Adaptation options designed to ensure water supply during average and drought conditions require integrated demand-side as well as supply-side strategies.
- Water resources management clearly impacts on many other policy areas, e.g., energy, health, food security and nature conservation.

Chapter 3 presents additional information about water-related issues and challenges arising as a result of climate change in Namibia. This sub-section therefore focuses solely on the health-related effects of such change in the country. The main health effects of a lack of access to clean water and sanitation are diarrhoeal and other diseases caused by biological and/or chemical contaminants. An increase of dehydration in water scarce areas is very likely. Poor drainage in human settlements increases exposure to contaminated water and provides habitat for mosquitoes and an improvement of parasitic breeding places, leading to increased incidence of water-borne and vector-borne diseases.

Changing rainfall and temperature patterns forecast to occur over the next decades are likely to make the provision of clean water, good sanitation and drainage even more complicated than it is at present. As the Namibian climate become more variable, the occurrence of droughts and floods is likely to become more frequent and intense. This implies that occasionally, increased rainfall in one season will reduce water scarcity in one region of Namibia, while other regions may suffer droughts. Namibia’s health system will most likely have to cope with more such extreme rainfall conditions, i.e. floods and associated health effects in one region, and water scarcity and its associated health implications in another.

Increasing surface water temperatures and a decreasing accessibility of water are likely to lead to declining water quality and an increase in the microbiological activities on such water resources (IPCC, 2008). Scarcity is likely to lead to an increase in migration and associated conflict; all conflicts have negative health repercussions. These effects are likely to lead to an
increase in health problems, particularly in vulnerable groups, such as infants, children under the age of five, pregnant women, the elderly and those with existing disease burdens. Cities and towns depending on open water sources to meet their water demand will be faced with an increase of costs to provide and treat water, especially as water runoff in contaminated river beds increases temporarily, and populations encroach on catchment areas (DRFN, 2008).

Overall, though, an increase in temperatures coupled to a shortening of the rainy season is likely going to lead to drier conditions in Namibia. In view of the current population growth rates, Namibia is therefore likely to witness an increase in the number of people living under water stress (IPCC, 2008; Arnell, 2004). Such water scarcity is also likely to increase the conflict potential within and between communities, and lead to an increase in the country’s overall health burden.

1.4.5 Increasing climatic variability and extreme weather events

According to the IPCC, the frequency of heavy rainfall events has increased over most land areas in the last decades (IPCC, 2007). More intense and longer droughts have been observed widely since the 1970s. Changes in extreme temperatures over the past 50 years have seen less frequent cold spells, and more frequent and intense heat waves than ever before (IPCC, 2007).

The reinsurance group Munich Re states that the number of weather-related disasters has increased, from an average of less than two per year in 1950, to more than six in 2007 (Munich RE, 2008). Over the same period, average annual economic losses have risen from less than US$5 billion to more than US$80 billion. In 2007, there were 960 major natural disasters (the highest ever such figure), with more than 90% being the result of extreme weather or climate-related events, and accounting for 95% of the 16,000 reported fatalities as well as 80% of the total economic losses valued at US$82 billion (Munich RE, 2008).

As indicated above, Namibia’s climatic variability is projected to increase as a result of climate change. This also implies that the number and severity of extreme weather events, for example floods and droughts, is likely to increase, both in frequency and severity.

There are a number of well-documented health effects that are directly linked to such extreme weather events. Most significantly, climate variability is likely to impact on the following:

- Partial or complete loss of potable water resources, which can lead to an increase of disease as a result of malnutrition, and/or propagation and use of contaminated water, and/or the reduction of food and the associated effects of malnutrition.
- Health problems caused by the partial or complete destruction of infrastructure, which is particularly severe if such infrastructure is related to water supply, sanitation, communication and drainage.
- Reduction of crop yields, resulting in temporary or even longer-term food shortages, poor nutrition, and malnutrition, and greater dependency from others.
• Partial or complete loss of livestock, resulting in medium- to long-term animal product shortages, poor nutrition, and malnutrition.

• Exacerbation of the health implications for vulnerable groups as a result of extreme temperatures, including elderly people and those with existing disease burdens such as HIV/AIDS, tuberculosis and malaria.

• Floods and associated open water sources, often contaminated, will have a negative impact on both human and animal health.

• Increased wind speeds and an increased frequency and severity of storms are likely to lead to a greater number of people suffering from dehydration, and dust-related complications arising from wind-induced dust pollution.

• Droughts will lead to the partial or even complete loss of crops and/or livestock, and disenfranchise those that have little or no recourse to formal insurance and/or other risk mitigation measures, leading to negative health outcomes.

• Mental health impacts, as a result of loss of life of family members and/or having to cope with a disaster, are likely to increase in both number and frequency.

1.5 Discussion of health-related impacts of climate change in Namibia

The above sections have listed a considerable number of direct health-related impacts that are expected to arise as a consequence of a changing climate in Namibia. However, while most of the above effects can be considered primary effects, it is noted that many health effects and implications are also expected to arise as a result of the secondary impacts of climate change. Such secondary, or flow-on, effects of relevance to human health include the impact of direct physical changes on:

• the accessibility, availability and affordability of food and water
• an increasing competition for resources, especially water, food and arable land
• the availability of shelter, and the effects of temporal dislocation
• the increase of specific diseases, such as cardiovascular diseases, diarrhoea, malaria and cholera
• sanitation systems (refer to the detrimental effects that the recurring floods have had on the sanitation systems in Oshakati and Ondangwa)
• the social and economic impacts of an increased disease burden in society
• the occurrence of migration, and the associated effects and impacts that migration has on increasing the spread of diseases, especially in peri-urban and urban areas
• the ability of the health sector to render effective services to a large number of affected individuals (a partial failure of the national health system is likely to increase the population-wide disease burden and cause society-wide disruptions)
• the deteriorating resilience and associated economic loss in the population as a result of frequent extreme events, and/or the significance of individual events
• the availability of financial resources that can be used to mitigate the effects of a climate-induced disaster
• the ability to muster international support
• the government as well as civil sector institutional capacities, and their ability to manage multiple or extreme events.

The above are a selection of important aspects that determine Namibia’s vulnerability and climate-related impact on the country’s health system. Generally, countries that have well-resourced institutions, functioning early warning systems, and are pro-actively preparing their populations for the impacts of climate change, for example by actively promoting adaptation measures, face a lower risk of being overwhelmed by the cumulative effects of climate change than those countries that have little inherent resilience, few additional financial resources and/or are unprepared.

Nationally and internationally the medical fraternity seems in agreement that even small increases in climate-sensitive conditions, such as the occurrence of diarrhoea and malnutrition, are likely to result in large increases in the total national disease burden. It is also widely accepted that those countries with low or marginal abilities to manage their existing disease burden will suffer the greatest consequences as a result of climate change.

Namibia is well-advised to prepare for the quick and effective mobilisation of the required financial, infrastructural and human capacities, so as to build institutional, communal and individual capacities to adequately respond and cope with the health-related impacts that climate change will impose. Our existing national disease burden, especially in regard to the HIV/AIDS pandemic and tuberculosis, as well as the significant percentage of the population living in poverty, implies that Namibia will find the effects of climate change severely challenging. Specific recommendations to enhance the Namibian health sector’s ability to cope with change are discussed in chapter 2 below.

1.6 References


DRFN, 2008. Climate Change Vulnerability and Adaptation Assessment Report Namibia, Desert Research Foundation of Namibia and Climate Systems Analysis Group of the University of Cape Town, for the Namibian Ministry of Environment and Tourism


NDHS, 2008. Namibia Demographic and Health Survey of 2006-07, Ministry of Health and Social Services, Windhoek, Namibia


PDNA, 2009. Post Disaster Needs Assessment, draft version 1 (for comment only) Government of the Republic of Namibia


SECTION 2:

Malaria and climate change in Namibia

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2 Malaria and climate change in Namibia

This chapter reviews the occurrence of malaria in Namibia, and investigates how climate change is likely to influence the future impact and spread of the disease. Based on this assessment, and complemented by interviews with key decision makers in Namibia’s health sector, this chapter thenformulates recommendations on how to incorporate and address climate-sensitive issues and aspects into Namibia’s health sector in general, and the country’s malaria control strategy in particular.

2.1 Assessment method

The following key source documents were reviewed, both to assess the impact that climate change is likely to have on the occurrence of malaria in Namibia, and to gain a better understanding of the country’s malaria control strategy:

- National Malaria Policy (NMP, 2005)
- Malaria Epidemic Preparedness and Response Guidelines (MEPRG, 2005)
- Namibia Demographic and Health Survey of 2006-07 (NDHS, 2008)
- Namibia National Health Accounts 2001/02 – 2006/07 (NNHA, 2008)
- Namibia’s Health Information System (HIS) and associated input forms
- Post Disaster Needs Assessment, draft version 1 (PDNA, 2009)
- Climate Change and Human Health - Risks and Responses (WHO, 2003)
- Malaria in Namibia (WHO, 2008)
- World Bank Booster Program for Malaria Control in Africa 2007 (WB, 2007)
- Mapping Malaria Risk in Africa (MARA, 2009)
- Climate Change Futures: Health, Ecological & Economic Dimensions (Harvard, 2005)
- Shrinking the Malaria Map – A prospectus on malaria elimination (GHG, 2009)
- as well as a number of specialist publications, as cited in the text.

In addition to the above-mentioned review, several key decision makers active in Namibia’s health sector were interviewed, with a view to establish a comprehensive understanding of the current state of malaria control in the country. The interviewees shared their opinions on the state of malaria control in Namibia, and its future. Also, they elaborated how the likely changes introduced by climate change and the multitude of associated social, environmental, financial and institutional factors will have an impact on such developments, and how these could be incorporated to strengthen Namibia’s health management system in general, and the malaria control strategy in particular.
The remainder of this chapter describes the key issues considered in framing the likely changes that the effects of climate change will have on malaria. It then formulates recommendations on how such changes can best be addressed in future.

The present assessment is primarily targeted at a non-medical audience. This implies that, although most specialist terms are briefly explained in the text, the present chapter does not address specialist topics, such as drug dosages, or types of insecticides. Lastly, in order to avoid duplication, the climate change-related information and general health impacts discussed in chapter 1 of this report will not be repeated here.

### 2.2 Introduction

Female anopheles mosquitoes carrying the plasmodium parasite transmit malaria from one human to another. When a human is bitten by such a mosquito, the infective parasite enters the person’s bloodstream. After further developing and multiplying in the liver, the parasite invades and destroys the red blood cells of its human host. If untreated, malaria can quickly become life-threatening, primarily by disrupting the blood supply to vital organs and weakening the infected host. Individuals most susceptible to the disease include pregnant women and their unborn babies, young children, people infected with HIV/AIDS, and individuals who have not developed immunity to the disease (WHO, 2009).

Malaria is characterised by intense fever, sweats and shaking chills, followed by extreme weakness. Chronic states of infection exist for most forms of malaria, producing anaemia, periodic fevers, and in some cases, chronic disability. The often debilitating symptoms of malaria exert a high cost to the individual sufferer, and in nations with high numbers of malaria-infected people, the disease exerts a development-retarding impact of economy-wide proportions.

Good human health is critical to economic development. Malaria reduces an individual’s ability to earn a living, and reduces national incomes, and with it the prospect of economic growth. The World Health Organisation estimates that approximately one-half of the world’s population is at risk of malaria, particularly those living in lower-income countries (WHO, 2009). Although malaria is preventable and curable, the disease continues to reduce economic growth rates by as much as 1.3% in some countries (WHO, 2009).

Malaria transmission rates depend on a number of local factors. Climatic conditions contributing to the spread of malaria include: the availability of sources of open water, a moderate to high temperature regime, and elevated humidity levels which promote the effective breeding of mosquitoes. In this regard, prolonged wet weather conditions and the

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3 A general introduction and non-specialist overview of malaria can for example be found at http://en.wikipedia.org/wiki/Malaria
presence of large-scale open water sources, such as those occurring under conditions of flood, promote the propagation of malaria.

Prolonged rainfall periods in low(er) temperature regimes is generally associated with a reduction in mosquito numbers. In addition, the proximity of mosquito breeding sites to people, and the types of mosquito species in a given area, is of importance. The management and specific control regime – to prevent and/or minimise the occurrence of malaria – have a most significant impact on the rate at which this vector-borne infection remains viable, and its speed and frequency of transmission (Harvard, 2005; WHO, 2009).

Some regions have a fairly constant number of transmissions and infections throughout the year; such areas are termed “malaria endemic”\(^4\). Other areas are characterised by the seasonal occurrence of malaria, which mostly coincides with the rainy season and availability of suitable mosquito breeding places. Malaria epidemics often arise when the mosquito-borne parasite is introduced to areas where people have had little or no prior contact to it, and/or where little or no immunity to malaria exists, and/or when people with low immunity move to areas infested with malaria-carrying mosquitoes (WHO, 2009).

Contemporary malaria control interventions include a variety of preventative measures, as well as the use of medicines to control the illness in infected persons. In Namibia, large-scale preventative measures include the spraying of suitable insecticides and DDT, while more localised household-level measures include the use of insecticidal nets, the application of insecticides by way of residual house spraying, and the use of prophylactic drugs and chemical agents. The treatment of infected persons is most effective when diagnosed early, and treatment commences promptly. Amongst others, artemisinin-based\(^6\) combination therapies are used. In many parts of the world, including Namibia, a number of local malaria parasite varieties have developed resistance to the more commonly applied malaria drugs (WHO, 2009).

Of all regions, sub-Saharan Africa carries the highest per capita disease burden, with malaria being the single most important ailment. As such, malaria is responsible for nearly one million deaths and between 300 to 500 million clinical cases every year (WHO, 2003; WHO, 2009). The distribution, transmission intensity and clinical consequences of malaria vary greatly across Africa. In Namibia, the major causes of death among children under the age of five years (accounting for 75% of the total) remain diarrhoea, malnutrition, malaria, and acute respiratory infections (NNHA, 2008), and some 7% of all inpatients deaths recorded in the financial year 2005/06 were attributable to malaria (MOHSS, 2006).

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4 A vector-borne infection, such as malaria, relies on the existence of an intermediary host (i.e. the mosquito), which then delivers the infectious parasite directly to subsequent hosts (humans), and avoids free living stages.

5 Native to an area; an infection is said to be endemic in a population when it is maintained without the need for external inputs.

6 A drug used to treat multi-drug resistant strains of malaria.
In order to effectively plan for and forecast the future spread and intensity of malaria epidemiology\(^7\), accurate statistics describing the distribution (where), transmission intensity (how much), seasonality (when), the population at risk (who), and the multitude of contextual and environmental determinants (why) promoting malaria have to be understood. In addition to capturing local infection occurrences in the Namibian Health Information System (HIS), regional efforts across southern Africa are under way to establish a database summarising the spatial distribution of malaria. Specifically, the “Mapping Malaria Risk in Africa” (MARA, 2009) collaboration was created with the single purpose to address informational gaps of relevance to malaria, and in this way assists local and regional planners and decision makers to better prepare for future epidemic malaria infestations (MARA, 2009). Having and maintaining accurate statistics underpinned by empirical data\(^8\) is seen as the single most important tool to formulate evidence-based approaches for more effective malaria control.

The Namibian government and a variety of international and local actors currently make a concerted effort to control malaria in the country. The Ministry of Health and Social Service’s (MOHSS) National Malaria Policy (NMP, 2005) and the Malaria Epidemic Preparedness and Response Guidelines (MEPRG, 2005) summarise the government’s approach to control malaria, and guides the efforts of a wide range of actors and activities aimed at minimising the effects and spread of malaria in the country.

The MOHSS’s National Vector-borne Diseases Control Programme is officially tasked, amongst others, with the control and management of efforts to prevent the occurrence of malaria and implement activities to control the disease. Other government ministries are also participating and contributing to this effort: the Ministry of Education’s National Literacy Programme, for example, provides an avenue for a community-based health care approaches, by involving some 3,000 literacy promoters in the advancement of health and prevention of ill health, and in reducing HIV/AIDS, malaria, diarrhoeal diseases, nutrition and other key health issues (CBHC, 2007).

Malaria control in Namibia is also supported by the Global Fund to Fight AIDS, Tuberculosis and Malaria, the World Health Organisation (WHO), UNICEF, UNAIDS and a number of non-governmental, faith-based and other private-sector organisations (WHO, 2008).

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\(^7\) Medical specialisation dealing with the transmission and control of diseases.

\(^8\) A method by which all data and evidence is obtained by way of observation, experience or experiment.
2.3 Malaria in Namibia

Figure 2-1 shows the present-day climatic suitability of endemic malaria in Namibia (MARA, 2009).

Malaria remains a major public health problem in Namibia (MOHSS, 2006; WHO, 2008). To illustrate, malaria accounted for 26.4% of outpatient cases, 21.6% admissions, and 8.6% of all hospital deaths in 2002 (WHO, 2008). Fortunately, the situation has improved markedly since 2004. As shown in Figure 2-2 the annual malaria-related mortality rate has decreased steadily ever since 2004.

As is shown in Figure 2-3, the incidence of malaria has steadily declined since 2004. In 2006 and 2007, the number of outpatients with malaria dropped by 35% and 79% respectively (WHO, 2008).
During 2005, the total number of malaria cases reported countrywide amounted to 369,077 cases, and 1,060 malaria-related deaths were recorded. In contrast, in 2007 the total number of reported malaria cases amounted to 102,381 cases while malaria-related deaths stood at 181 (WHO, 2008). It should be noted however that year-on-year incidences of malaria are highly variable, and the occurrence of malaria is closely correlated with the prevailing temperature, rainfall and humidity.

Figure 2-4 shows the distribution of endemic malaria in the country.

Malaria is considered endemic in Caprivi, Kavango, Kunene, Ohangwena, Oshana, Oshikoto, and part of Otjozondjupa and Omaheke regions (NDHS, 2008).

The Okavango and Caprivi regions experience high temperatures, high rainfall and high humidity, which are conditions conducive to mosquito breeding and parasite development. In these two regions in particular, the existence of perennial rivers and associated open surface waters renders malaria transmission
perennial⁹, while a seasonal transmission peak occurs from the middle to the end of the rainy season.

Generally though, malaria in north-east Namibia tends to be more stable than in other parts of the country. The duration of the present-day malaria transmission season is depicted in Figure 2-5. It shows that the country’s north and northeastern regions have a climate that is suitable for the transmission of malaria for between four and six months per year. In contrast, in north-western and parts of central Namibia, malaria transmission is seasonal and follows the onset of rains – a peak usually occurs between February and May. Here, the occurrence of malaria is seasonally dependent and is therefore unstable. Seasonality, climatic variability and unstable occurrences increase the risk of malaria temporal and spatial epidemics¹⁰.

Namibia’s coastal regions and much of southern Namibia are free from malaria. This is largely due to generally low humidity levels, the by and large dry weather conditions, and the absence of open water sources suitable for mosquito breeding.

In 2002, the MOHSS established the Directorate Special Programmes, to coordinate, amongst others, the ministry’s response to malaria (MOHSS, 2006). The Directorate houses the National Vector-borne Diseases Control Programme (NVDCP), which is tasked with the control and management of malaria and other vector-borne diseases. The NVDCP’s malaria control effort includes a program supported by vector control equipment, including tractors and hand-held spraying pumps, the distribution of insecticide-treated mosquito nets, spraying

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⁹ throughout the year

¹⁰ a widespread outbreak in which many people are infected at the same time
of DDT and insecticides, the distribution and administering of anti-malarial drugs, the application of prophylactic drugs, and public awareness raising on prevention, indication and treatment (MHSS, 2006).

The Namibia Demographic and Health Survey of 2006/2007 (NDHS, 2008) presents data on the occurrence of malaria in the country, and illustrates the efforts made to control the disease. It reports, for example, that 25% of households in Namibia own at least one mosquito net, and 10% have more than one net. Most such nets are insecticide-treated nets (ITNs). The use of ITNs is one of the primary health interventions aimed to reduce malaria transmission. The National Malaria Control Program has been distributing long-lasting ITNs free of charge to pregnant women as well as children under the age of five years. It is interesting to note that 11% of all children under age five, and 9% of pregnant women slept under a treated net the night before the 2006/2007 survey. Among women who had their last birth in the two years before the survey, 30% took an anti-malarial drug during their pregnancy (NDHS, 2008).

A number of advocacy campaigns have taken place to educate the general public on the importance of preventing malaria, using nets and other techniques, especially targeting pregnant women. Mosquito net usage among pregnant women is higher in rural areas (13%) than in urban areas (7%). Use of a mosquito net also varies across socio-economic groups, with the two lowest income groups having the highest use of mosquito nets. Pregnant women in rural areas are twice as likely as those in urban areas to take anti-malarial medication (38% and 19%, respectively) (NDHS, 2008).

Control of malaria vectors is seen as the best way to protect communities against infection. Vector control measures, such as indoor residual spraying of houses (IRS) and the use of insecticide-treated nets, have the ability to reduce malaria incidence and prevalence (WHO, 2006). Other preventative measures include the use of chemical repellents, mosquito coils, and burning of leaves. The National Malaria Control Program envisions that by 2010, 80% of all uncomplicated malaria will receive the correct treatment within 24 hours of being diagnosed, and that 80% of targeted structures will be treated using indoor residual spraying, to achieve reductions in malaria transmission. This coincides with one of the key objectives of the Namibian Malaria Policy, which stipulates the prompt and effective treatment of malaria within 24 hours of onset of symptoms. Community education is an additional strategy, focusing on the signs and symptoms of malaria, especially during the annual malaria awareness week and associated campaigns (MOHSS, 2005).

Health insurance in Namibia only reaches some 28% of the population (NDHS, 2008). Most of the people who lack health insurance coverage are poor and live in rural areas – they are also the ones affected mostly by malaria. A widely held view seems to be that the current health insurance industry does not provide effective cover for those most likely to suffer from malaria. The Social Security Commission and the Government Medical Aid Scheme provide health insurance for those who work – this is less relevant to the unemployed. Private health insurance is available to people who can pay the premiums.
2.4 Malaria and its likely response to climate change in Namibia

Climate exerts a strong influence on the spatial distribution, intensity of transmission, and seasonality of vector-borne diseases such as malaria (WHO, 2003; WHO, 2005). Of particular importance to mosquito breeding are the prevailing temperature and humidity levels, as well as the availability of surface water. Mosquitoes need access to stagnant water in order to breed, while adult mosquitoes need humid conditions to remain viable (WHO, 2003).

Warmer temperatures enhance mosquito breeding, and reduce the pathogen’s maturation period in the mosquito. Very hot and dry conditions, on the other hand, can reduce mosquito survival. For example, at 20°C the protozoa of *plasmodium falciparum* take 26 days to incubate while at 25°C the parasites develop in half the time (McArthur, 1972). Warmer temperatures therefore permit parasites to mature quicker, which in turn increases the opportunities for parasite-carrying mosquitoes to pass on the parasites to previously uninfected humans. In addition, as temperatures increase, the seasonal duration of malaria is likely to increase as well.

Analyses of temperature data in East Africa have found a significant warming trend since the end of the 1970s, and the magnitude of this change affects the mosquito-to-human transmission rates (Pascual et al, 2006). At the same time, separate analyses of time-series data have indicated that the incidence of malaria has increased in these areas (Hay et al, 2006; Tanser et al, 2003). A correlation between the observed increase in temperatures and an increase in mosquito populations seems very likely (Kovats et al, 2005). However, it has also been suggested that transmission increases could have been due to an increasing drug resistance of the malaria parasite and a decrease in vector control activities (Reiter et al, 2005; Reiter, 2008).

Rainfall is another significant indicator of future mosquito populations. There is some evidence of reductions in transmission associated with decadal decreases in rainfall, and a marked increase of mosquito populations when strong rainfall events are recorded (Tanser et al, 2003). This also implies that seasonal weather forecasts are a critical tool to be used in the forecast of malaria occurrences and control in southern Africa; this is discussed in further detail in section 2.5 below.

In regard to the importance of socio-economic development, it has been found in sub-Saharan Africa that it has had only limited impact on curtailing the distribution of the disease (Hay et al, 2002). A temporary reduction of mosquito populations, for example as a result of better control or drought conditions, is generally associated with a reduction of the parasite

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11 disease-producing agent
12 *Plasmodium falciparum* is one of the species of plasmodium that causes malaria in humans; it is considered the most dangerous of the malarial infections as it leads to the highest rates of complications and mortality.
transmission. Communities who experience a drop in infection rates may, in time, see an increase in the population of non-immune human hosts. So, while the overall incidence of malaria decreases in such cases, primarily because the abundance of mosquitoes is reduced, epidemics are even more likely to occur as soon as suitable climatic conditions are re-established. This is an important realisation, and has wide-ranging implications for the methods used to control malaria.

It is assumed that climatic changes over recent decades have already affected some health outcomes. For example, the World Health Organisation estimated that climate change was responsible for approximately 6% of malaria in some middle-income countries in 2000 (WHO, 2003). However, small changes (e.g. an increase in malaria) against a generally noisy background of ongoing changes in other causal factors (e.g. socio-economic and/or demographic developments) are often hard to identify. More specifically, in southern Africa, long-term trends for malaria were not significantly associated with climate, even though seasonal changes in case numbers were significantly associated with some climatic variables (Craig et al, 2004). On the other hand, much more significant correlations were observed when comparing the increase in malaria with malarial drug resistance, and HIV infections (Craig et al, 2004). Such secondary drivers of malarial spread could well be more prominent than originally suspected. It should also be noted that more complex causative drivers will generally complicate the attempts to predict the changes of malaria occurring as a result of climate change.

A considerable number of studies have linked climate change with changing health issues. One such study, of particular relevance to the changes in malaria, uses sixteen climate change scenarios to show that by the year 2100, the changes in temperature and precipitation could alter the geographical distribution of malaria in Zimbabwe. It finds that previously unsuitable areas of dense human population are becoming suitable for the transmission of malaria (Ebi et al, 2005). However, to illustrate that there is no consensus on the implications of climate change on the changes in malaria, another study finds that by mid-century, much of southern-central Africa is likely to become unsuitable for malaria transmission (Thomas, 2004). Yet another study finds that fewer but heavier rainfall events are likely to affect mosquito breeding, but states that malaria is unlikely to establish itself unless such events are accompanied by a dramatic deterioration in the public health response (WHO, 2003). In Namibia, there has been a systematic reduction of malaria cases and mortalities since 2004 (WHO, 2008), but the main causal agents have not yet been identified with certainty.

The expected increase in climate variability by mid-century is likely to increase the number and frequency of both droughts and floods in Namibia (refer to chapter 1 of this report). On the one hand, an increase in rainfall intensity is likely to create more opportunities for mosquitoes to breed, as new open water sources are likely to be created under such conditions, and heavy rainfall events are expected to create new mosquito breeding sites along roadways and in receptacles. On the other hand, an increase in flooding is likely to wash away mosquito eggs and deteriorate some of the current breeding places. A rapid change between floods and droughts is expected to lead to more frequent episodes of malaria,
as such extreme events may encourage the migration of human populations into or out of malaria-prone areas.

Climate change is also expected to lead to changes of other variables that have a direct bearing on the distribution of malaria: not only is population migration a major risk in case of severe weather conditions, but land use changes including deforestation and the associated food insecurity and malnutrition are expected to become key issues too (Yé et al, 2007). In addition, drug and pesticide resistance, and a host of secondary effects, are likely to influence the burden on the existing public health infrastructure too (IPCC, 2007; IPCC, 2008). Here, the cumulative effects brought about by climate change are likely to be of cardinal importance as several separate health conditions are likely to emerge at more or less the same time, all requiring the same resources and rapid attention (WHO, 2003).

Specifically, changes to the occurrence of malaria can be expected in areas bordering current endemic zones. It is likely that, given that the pre-requisites of mosquito breeding are met, such marginal areas will experience higher mosquito occurrences and therefore an increased number of malaria cases in future. Such sporadic occurrences may in time increase the range of endemic areas. Here, the year-on-year climate variability is of particular importance, as the transmission cycle is likely to be broken in rainfall-poor years, which in turn decreases the immunity of the local population. The management of sporadic episodes of increased malaria occurrence and epidemics, and the ongoing management in malaria endemic areas will continue to play a cardinal role in determining if and how malaria will be affected by climate change. The control and management regime used is expected to be decisive whether or not malaria will be able to increase its footprint in Namibia as the climate changes.

Malaria management determines if and how infection change, and how effective resources are used to combat the occurrence and spread of the disease. The first detectable changes in human health, related to the spread of malaria, are likely to come from changes in the geographic range and seasonality of the disease. Here, suitable indicators that will signal changes in disease frequency and patterns will be of particular importance. Warmer average temperatures combined with increased climatic variability are likely to alter the pattern of exposure to thermal extremes and the resultant health impacts, in both summer and winter. This implies that temperature- and rainfall-related indicators will be useful to monitor, and incorporate in models that predict the spread of season-dependent diseases. As such, changes in health patterns in specific areas – for example an increase in malaria occurrences in areas that have previously had little or no exposure to the disease – are likely to be amongst the leading indicators of climate change, and will require special attention in future.

In contrast to such leading indicators are the slow-onset public health implications which are expected to become more visible as a result of climate change-related disturbances of the natural and managed food-producing ecosystems. These are termed lagging indicators. Data capturing and malaria forecasting processes that ensure that suitable indicators of climate and disease changes, such as temperature-related indicators as well as health-related indicators, are captured and analysed, is highly recommended. This aspect is further discussed in section 2.5 below. Of note in the present discussion is that a set of carefully chosen leading as well as
lagging indicators is required to assess if and how malaria will make climate-induced inroads in future, or whether climate change is actually leading to decreases in the occurrence of malaria in Namibia.

It is concluded that the available evidence does not yet allow a conclusive statement about the response of malaria in the face of a changing climate. However, it seems probable that Namibia-specific climate change predictions imply an expansion and increased spread of non-endemic malaria in future, especially in view of the effects that an increase in climate variability has on the spread of the disease.

2.5 Malaria management and indicators in Namibia

This sub-section describes the current management practices of relevance in the control of malaria in Namibia, and identifies and assesses the set of indicators used to classify and respond to occurrences of malaria. From this assessment, an analysis considering how the current set of malaria-related indicators could be used to identify changes in the climate-induced occurrence and spread of malaria is developed.

The sub-section concludes with recommendations on how current management practices as they relate to the control of malaria should be adapted in order to minimise climate change-related increases in the occurrence of malaria in Namibia, and effectively deal with the anticipated increase in variability of future malaria cases in the country.

2.5.1 Managing malaria

Namibia’s National Malaria Policy (NMP, 2005) describes the national response to malaria in general, and malaria control mechanisms in particular. The Policy is supported by the Malaria Epidemic Preparedness and Response Guidelines (MEPRG, 2005), which describe the surveillance and monitoring processes, the methods of recognition, verification and notification, how resources are to be prepared and mobilised, the implementation of epidemic control measures, as well as the monitoring, evaluation and post-epidemic assessment of the disease.

The present sub-section describes the main elements used in the management and control of malaria in Namibia and the interested reader is encouraged to consult the above-mentioned references for an in-detail description of specific control and management procedures.

The Ministry of Health and Social Services (MOHSS) hosts the Directorate of Special Programmes, which implements the National Vector-borne Diseases Control Programme (NVDCP). The NVDCP is a comprehensive programmatic approach to control malaria and other vector-borne diseases in Namibia.

In regard to malaria control, the NVDCP provides an operational definition of a malaria epidemic, i.e. “number of malaria cases for a given week exceeding the 3rd quartile number of cases for the same week in a three to five years data set”. This definition is significant
because it deviates from the more conventional definition of a malaria epidemic\(^{13}\) in that it narrows down the range as well as the data set through which the severity of an outbreak is classified. This specificity is of particular value to health workers and provides targeted procedural guidance to data analysts, and in turn to policy makers.

The NVDCP is tasked with the forecasting of malaria epidemics, for example by using weather forecasts and other factors that have an impact on the spread and transmission of malaria. Presently however, very few such predictive activities take place, and the principal disease control mechanisms are decided upon by assessing the present-day disease occurrence. This focus on weekly and monthly occurrences also implies that longer-term trends, for example caused by a changing climate, would not be anticipated, and that response measures would most likely not have been put in place timely. In the absence of forecasts, malaria control will continue to only rely on empirical\(^{14}\) data collected by clinics, which limits the control and effective future management of malaria in Namibia.

The NVDCP recognises the all-important impact that regular surveillance and monitoring has on the control of malaria. It also identifies the importance of good communication between peripheral health services, district coordinating committees, regional management teams and national level coordination. Data on malaria is routinely collected from all health facilities at operational level, and transmitted to be integrated into the Namibian Health Information System (HIS). Some data analysis is done at district and regional level, and weekly malaria statistics are communicated to the various district coordinating committees.

Malaria surveillance data is collected by most health facilities, which allows for a timely detection of emerging malaria epidemics and the formulation of suitable response measures. At local level, an epidemic monitoring chart is used to indicate malaria cases on a week-by-week basis and by comparing these to 3\(^{rd}\) quartile data derived from malaria incidences in the past five years or so, the status of occurrences and arising epidemics is indicated. Such monitoring charts are used to alert health workers to the most immediate number and status of malaria occurrences. Once an epidemic is registered, the origin and specific location(s) of affected villages where the greatest number of cases occur is identified. In case of a malaria epidemic, community leaders and the community are informed. Likewise, villagers are encouraged to report unusual increases in the incidence of malaria to the nearest clinic. While the NDVCP envisages the participation of non-medical institutions in the monitoring and surveillance of malaria, few formal arrangements are presently in place.

\(^{13}\) The monthly occurrence of a number of clinical and/or laboratory confirmed cases in a given population, at a particular time and place, in excess of the expected number of cases.

\(^{14}\) A method by which all data and evidence is obtained by way of observation, experience or experiment.
Recognition of a new malaria epidemic is the responsibility of the principal medical officer and the head of the health institution concerned. They in turn communicate the status to both regional and national teams, and report on their actions. Newly recognised epidemics are then verified, using the indicators discussed in section 2.5.2 below, as well as entomological studies and clinical and laboratory confirmations, if required. Verification triggers notification, whereby the principal medical officer informs the regional management team, who in turn inform the national level, who declare the epidemic and inform relevant bodies both inside and outside the MOHSS, as well as the National Emergency Management Unit in the Office of the Prime Minister, and others.

The Malaria Epidemic Preparedness and Response Guidelines (MEPRG) also describe how regional health centres and clinics are to prepare themselves for possible epidemics. Figure 2-6 below illustrates the various steps which are part of the set of responses to a malaria epidemic in Namibia (MEPRG, 2005).

The MEPRG gives guidance on the types and quantities of insecticides that have to be available, the management thereof, specific drug requirements, diagnostic equipment and supplies, as well as personnel requirements and finance. Of note is that the National Emergency Management Unit (EMU) is responsible for the mobilisation of emergency funds from the Ministry of Finance, while the NVDCP is tasked with preparing the necessary proposals for such assistance. Both EMU and NVCDP are responsible to liaise with international donor partners, such as the WHO, UNICEF, UNAIDS and others, to mobilise funds and equipment for the control of epidemics.

The implementation of control measures to meet epidemics is based on the reaction of local health clinics. Here, vector control measures are emphasised. While reactive case treatment is applied in non-epidemic stages, active case detection is used once an epidemic is likely or has occurred. Clinical symptoms are used for diagnosis, supported by laboratory and clinical diagnosis when available. Depending on the diagnosis, patients are classified and treated...
according to the severity of symptoms. In some epidemics, mass drug administration to all members of an affected area is given.

Epidemics are monitored and evaluated, and post-epidemic assessments are undertaken too. Of note is the collection of post-epidemic information, which covers a broad spectrum of causative and peripheral information of importance to the epidemic and its dynamics. Here, local affected persons provide such information, either as part of an interview, or in review meetings. Results of such evaluations are incorporated in the re-planning of epidemic responses and preparedness.

More general disease control measures used to manage malaria in Namibia include

- providing early diagnosis and prompt treatment
- planning and implementing selective and sustainable preventative measures, including vector control by way of indoor residual spraying and the use of insecticide treated bednets, and
- early detecting, containment or prevention of epidemics.

The above measures are also supported and integrated into existing primary health care processes in the country. In addition, some effort is undertaken to develop research capabilities to support malaria control measures. Namibia’s malaria control effort is supported by a number of international partners, including the WHO, Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM), UNICEF, UNAIDS, non-governmental organisations, the Namibian Defence Force, and community organisations (WHO, 2008).

Namibia’s malaria control and management regime is said to have contributed largely to the decreasing trend of malaria cases in the country, i.e. the consistent decline of annual malaria cases as from 2004 (refer to Figure 2-3). The increased distribution of insecticide treated bednets, improvements in capacity building and training of staff operating spraying equipment, and a change in drugs introduced from 2005 are viewed as the main contributors in the successful fight against the disease (WHO, 2008).

Despite these positive developments in the control of malaria, the following aspects remain challenges in further decreasing or even eliminating the occurrence of malaria:

- **Ongoing capacity constraints:** effective malaria control requires support from epidemiologists and parasitologists, at national, regional and district level. Presently, such expertise and technical capacity is often unavailable, specifically in rural Namibia.
- **Surveillance:** capacity for entomological surveillance need further strengthening, especially to bolster the management of the malaria control unit at Oshakati.
- **Community based malaria control:** community information and awareness, education and more targeted communication is required to further strengthen the health outreach and community health programs.
- **Transport:** as is the case in many other development-related endeavours in Namibia, transport remains a bottleneck for many malaria control efforts in affected areas. This is particularly true in times of epidemics when the demand for vehicles is greatest.
• **Cross-border cooperation:** enhancing cross-border malaria control activities with neighbouring countries is expected to lead to a more effective control regime, for example by way of better coordinated malaria prevention and control measures.

The next sub-section will contrast the above malaria management and control measures with the set of indicators used to monitor malaria in Namibia, and will reflect on the adequacy and coverage of the malaria indicators that are currently in use.

### 2.5.2 Malaria indicators

The Malaria Epidemic Preparedness and Response Guidelines (MEPRG, 2005) identify the following set of malaria indicators used for routine surveillance of the disease:

- morbidity by age group (of outpatients and inpatients)
- unusual increases of fever incidence, clinically suspected malaria cases and rates of laboratory diagnosed malaria, especially during the transmission season
- increased consumption of antimalarial drugs
- proliferation of known breeding sites
- decline in the susceptibility of vectors to insecticides or alternatively a change in vector behaviour, which leads to avoidance of the insecticide being used
- parasite resistance to antimalarial drugs.

The Namibian Health Information System (HIS) captures the data collected through the HIS input forms. Of interest to malaria are the following aspects, which require medical personnel to quantify:

- the number of outpatients diagnosed with malaria per month
- the number of identified and referred malaria cases per month
- a number of indicators relating to environmental health services, including the number of complaints about food safety, drinking water supply quality and malaria control, and the number of samples taken for the analysis of food and drinking water.

Also of note are the malaria-related targets / indicators put forward in the Millennium Development Goals (WHO, 2008). Specifically, target 8 envisions to “have halted by 2015 and begun to reverse the indicators of malaria and other major diseases”, and lists the following indicators:

- prevalence and death rates associated with malaria
- number of notified malaria cases per 100,000 population per year
- proportion of population in malaria-risk areas using effective malaria prevention and treatment measures
- percentage of population under five years of age in malaria-risk areas using insecticide treated mosquito nets
- percentage of population under five years of age in malaria-risk areas with fever being treated with effective antimalarial drugs.
Given the various indicator sets described above, this sub-section asks: can the various indicators listed above be used to identify changes in the occurrence and spread of malaria which are attributable to the effects of climate change? Firstly, it is of note that the indicators put forward in the MEPRG are all lagging indicators. This implies that they record a specific situation after an event – such as an epidemic – has taken place, or at the end of a particular month. In contrast to lagging indicators are leading indicators, which are process and/or input indicators, such as expected vector numbers, climate trends and level of preparedness. Lagging indicators are essential to build reliable statistics to identify long-term trends. However, in themselves they are not suitable to predict changes, or make forecasts about future events. Data and statistics based on lagging indicators however can be used to make predictions about the future, for example the expected number of malaria cases based on past experiences, which in turn can inform decision makers to better anticipate and prepare for coming events. This requires data extrapolation, and/or the use of such data in purpose-built forecasting models. The absence of leading indicators in the set of national malaria indicators demonstrates the current emphasis on after-event recording, rather than before-event anticipation.

Trend analysis in turn can indicate the presence of drivers of change: for example, correlating weather data with particular malaria trends can be used to assess climate-vector linkages. However, as discussed earlier in this chapter, while the expected climate changes in regard to temperature increases favour larger future mosquito populations, the occurrence of more intense rainfall episodes will imply that mosquito populations become less viable. In addition, management control measures and changes in human behaviours also play a significant role in determining the evolution of the disease (Reiter, 2008). This implies that it is not possible today to predict with any degree of accuracy how climate change will influence the spread and occurrences of malaria in Namibia in future.

Also, taking the current set of indicators of malaria incidences and severity into account, it is concluded that these indicators do not allow any conclusions about possible correlations between climate-induced increases or decreases in malaria. In fact, the current set of malaria indicators are best used to track malaria occurrences, but have little value in informing pro-active control and management procedures for climate-related changes. So, while the indicators are comprehensive and allow an assessment of current management effectiveness and the spread and prevalence of malaria today, they cannot effectively serve to prepare for future climate-induced changes in the occurrence of malaria.

The next sub-section formulates some recommendations on how the country’s management practices – as they specifically relate to malaria prevention and control – can be strengthened to better cope with the anticipated impacts of climate change.
2.5.3 Strengthening malaria management practices – data and indicator focus

This sub-section departs from the following introductory question: how can current malaria management practices be strengthened to better cope with the changes in malaria occurrences expected to take place as a result of climate change? It should be noted that this sub-section focuses only on data-related issues of importance to malaria management and control, and the reader is referred to section 2.6 below which presents more general recommendations on how malaria control can be strengthened in Namibia.

Sections 2.5.1 and 2.5.2 above have highlighted the following key data-related management issues emerging from an assessment of the national malaria control efforts:

- climate-specific data is not used in the analyses of malaria incidences and for forward planning
- malaria forecasting capabilities are minimal
- present malaria indicators lack climate-specific correlation.

These key issues are re-phrased as specific recommendations, and read:

- incorporate climate-specific data in malaria analyses
- strengthen malaria forecasting capabilities
- enhance malaria-specific weather data to allow for malaria-climate correlations

The remainder of this sub-section discusses the above recommendations in further detail.

2.5.3.1 Incorporate climate-specific data in malaria analyses

Reliable empirical data strengthens any analysis. Presently however, little or no climate-specific data is taken into account when analysing year-on-year malaria trends, or deducing the effectiveness of present control and management methods. This is a major drawback, as vector control depends on external variables, such as climate data, as well as ‘internal variables’, including specific management and control activities. Focusing solely on internal variables renders an assessment of the overall successes and failures of a specific management regime one-sided, and therefore less reliable. In addition it is realised that many external variables will be at least as important in the overall spread and occurrence of malaria as the internal ones.

It is therefore suggested that Namibian malaria data is subjected to a re-analysis, which takes climate-specific data and malaria-climate correlations into account. It is recognised that current capacity constraints and the availability of reliable climate data will likely be cited as barriers that complicate or even prevent this task. However, even if some climate-specific data has to be interpolated from regional data sets, it would be of great interest to better understand the degree of correlation between climatic patterns in general, and the weather-specific occurrences of malaria in micro-locations. In order to deal with the prevailing capacity constraints, it is furthermore recommended that data modeling tasks and analyses of
the malaria-climate data is outsourced, in case suitable capacity cannot be found within the ministry and/or NDVCP.

Lastly, future malaria analyses should take climate-specific data into account, to better prepare for those years in which climate extremes are bound to lead to more intense malaria epidemics and occurrences, and inform the level of management effort to further control the disease in Namibia.

2.5.3.2 Strengthen malaria forecasting capabilities

Improving local forecasting capabilities will save lives, and reduce response times and costs. As such, forecasting models need to be developed that take a longer-term view of the current malaria management and occurrence regime, and specifically incorporate seasonal and longer-term weather forecasts. In this way, scenario planning can be strengthened (refer to 2.6.3 below), while response planning (for example to better meet the requirements of an upcoming El Nino season) and implementation will become more robust too.

It is recognised that no amount of forecasting will reduce the suffering of those who are already infected by malaria. However, accurate forecasting can considerably reduce the number and frequency of infected persons, and reduce transmission rates. Spending public monies on strengthening forecasting capabilities needs to be balanced with spending those same funds by way of actual prevention and the implementation of control measures. Such a proposition implies that if forecasting can reduce the costs incurred for prevention and control, then improved forecasting capabilities are indeed cost effective and desirable.

While a cost-benefit analysis to compare the savings that better forecasting would have – in contrast to boosting prevention efforts – is not available at present, a comparison of such costs and benefits may give a first indication of trends: presently, the stock of drugs and prevention measures undertaken depend largely on the scale of last year’s effort and spread of malaria epidemics. With improved forecasting capabilities, decision makers would more pointedly authorise purchases and order the distribution of additional drugs. In addition, the roll-out of control measures would also be more specific. In this way, improved forecasting capabilities will allow for an improved planning and budgeting of emergency measures, which saves lives and costs, while also saving the costs of unnecessary interventions. While it is recognised that local forecasting capabilities are not yet as well-developed as would be desirable, there are a number of regional initiatives as well as private sector expertise in Namibia which should be called upon when strengthening such capabilities in future.

2.5.3.3 Enhance malaria-specific weather data

As has been shown in section 2.5.2 above, the set of malaria indicators used in Namibia does not include climate-specific elements. To allow malaria control to become more pro-active requires additional indicators that make specific reference and track climatic data of relevance to malaria control, and for improved malaria management planning.
While pragmatism dictates that not every health centre collecting malaria data can become a branch of the Namibia Meteorological Service (NMS), technology exists to have a network of meteorological stations positioned strategically across the malaria endemic areas of Namibia to ensure that local weather data of interest to malaria forecasters is captured more comprehensively.

Such weather data should also be shared with regional forecasters, and will broaden the national malaria-related set of indicators. An added benefit of improved local weather data would be that local agriculture and agricultural output could be strengthened, which in turn will strengthen the food security of malaria-affected people, in addition to having many other benefits that have no direct relevance to the occurrence of malaria.

### 2.6 Addressing climate change-related impacts on malaria

Patterns of malaria transmission and disease vary markedly within Namibia, and between the regions. Such a non-uniform disease response is due to the variations in socio-ecological and economic realities, the climatic and ecological conditions, and people’s access to effective health care and prevention services. Given the natural variability of the disease, and the as yet uncertain predictions on its response to the multi-faceted changes introduced by climate change, one needs to ask how a public health system is to best prepare itself for an increase in the variability of the disease, and its many contributing factors, while at the same time investing public funds where the public good is maximised. This section therefore frames the above issue and formulates recommendations based on the following lead questions: *how can climate change-related impacts on malaria be addressed most effectively? And, what should Namibia do to prepare itself to effectively meet this challenge as the impacts of a changing climate become more pronounced?*

In order to minimise adverse effects on human health brought about by climate change, one needs to differentiate between the immediate year-to-year health imperatives from the fast-onset drivers of such change. For example, challenges to the health system arising from changing patterns of disease, such as the encroachment of malaria into new areas, can be met by responses that are mere ramped-up business-as-usual responses. These include enhanced vector control, better promotion and distribution of mosquito nets, more efficient and timely distribution of anti-malarial drugs, improved pre-emptive spraying campaigns, and an enhanced diagnosis and treatment regime. Such measures – which essentially require current efforts to be improved and intensified when and where required – need to be contrasted against those measures that are required to meet the demands on the health system brought about by abrupt and/or fast-onset changes.

Fast-onset changes can include the large-scale social upheaval due to catastrophic climate impacts (e.g. one or several years of severe drought, or several years of substantial flooding, or a combination thereof), as well as a number of secondary effects that extreme climatic events are likely to bring about. Such effects can, for example, include food and water shortages, large-scale forced migration, large-scale destruction of shelter and/or
infrastructure, the onset of animal diseases, and many others. While slow-onset and linear changes in prevailing weather patterns (and by implication of disease) require deliberate and well-planned public health responses, fast-onset changes are more likely to be effectively dealt with under the umbrella of a nationally coordinated emergency response. Such an emergency response would have to respond to public health concerns, ensure public safety, make available food and water, and provide short-term shelter to those in need. No single response, however well planned, will address every situation effectively. The ability to satisfactorily address circumstances may in some cases be limited by the degradation of infrastructure, and by longer-term impacts that social and/or economic stressors have caused in the preceding years.

In order to ensure that Namibia keeps on developing its national capabilities and capacities to effectively meet its current and future health challenges, particularly those posed by endemic as well as epidemic malaria outbreaks, an integrated health system-wide response is required. The elaborations in the previous sections lead to a set of recommendations of key actions, designed to ensure that Namibia’s national response to climate-driven malaria developments can continue to cope with the present disease burden, while systematically preparing and strengthening for additional large-scale epidemic outbreaks. It is to be noted that Namibia’s National Malaria Policy (NMP, 2005) has already put forward a range of strategies to control malaria. The following recommendations have therefore been formulated to complement and strengthen existing health initiatives and programmes to better control malaria, by specifically addressing how the expected impacts that a changing climate will exert on the Namibian health system can be met.

The following key actions – in telegraphic style – are recommended:

- enhance and further mainstream climate-related awareness
- improve access to timely and relevant information (e.g. on climate change and associated health responses)
- undertake scenario development and pro-active planning to address both fast-onset and slow-onset climate-induced events
- strengthen the policies required to effectively address both slow-onset and catastrophic events
- develop health-centred adaptation strategies to prepare for climate-induced changes
- climate-proof the public health system to deal with adverse health repercussions and outcomes from climate-related changes
- ensure that water and sanitation systems are strengthened.

The remainder of this sub-section will address and describe the above key recommendations in further detail.
2.6.1 Enhance climate-related awareness

Much has been said about the need for raising awareness. Little of what will be said in this sub-section can be considered original, or new. In regard to enhancing climate-related awareness, it will be of essence that decision makers, irrespective whether they are the ones heading a household or in charge of implementing national malaria control measures, are and remain well-informed about the predictions and implications of climate change, especially those of relevance to the climate-induced changes of malaria infestations. In this regard it is recommended that health professionals and climate change experts work hand-in-hand to ensure that health-related information requirements are continuously shared and understood by the climate change fraternity, and vice versa.

In this way, a synergistic relationship between these disparate groups of professionals should emerge, which will benefit all participants. Because, as has been discussed in previous sections, health-related indicators can be leading indicators of climate change, such as the occurrence of malaria infestations in certain areas or the distribution and dynamics of water- or vector-borne diseases, climate change specialists will benefit from such empirical data to “ground-truth” their down-scaled climate models. Health professionals, on the other hand, will greatly benefit from being fully aware of contemporary climate models and their predictive powers and applicability to forecast epidemiological developments. Such models are expected to make an increasing contribution to forecasting how vector-borne diseases will evolve in future. In this way, such models will contribute to decision making and ensuring that the required resources to meet new challenges are mobilised as and when they arise.

A great many local decisions at household level will determine how effective national malaria control measures will be. Such local actions are best supported if local decision makers are aware of the available options, and can make educated decisions. Such a decentralised way of decision making is likely to be the most cost-effective manner to meet the challenges that changing malaria dynamics will impose in future. It can best be made actionable when local decision makers are fully aware of the implications of climate change in general, and the specific household level impacts that such changes are likely to introduce.

It is concluded that a deliberate effort to educate and create awareness on climate change-related issues of relevance to both households and health professionals will achieve broad-based knowledge in the community, which has a host of co-benefits while also lighten the load on the public health system in future.

2.6.2 Improve access to information

Generating reliable, relevant and up-to-date information is essential in order to respond to the health impacts that a changing climate will introduce. However, information costs money, and requires both political will and sufficient individual and institutional capacity to generate it reliably. Generating and disseminating relevant information about the public health effects of climate change, and how to address them, is essential. No awareness campaign can do
Information pertaining to disease and transmission dynamics, changing vulnerabilities of communities, region-specific disease burdens, adaptation mechanisms, national early warning and response capabilities, location-specific capacities and many other details are required to plan for the next epidemic, or merely meet the drug and outreach needs required in the next rainy season. The World Health Organisation has identified key gaps in knowledge, notably a lack of region-specific projections of changes in health-related exposures and a lack of research on health outcomes (WHO, 2006).

The following are considered key elements of any information provision strategy that seeks to minimise the adverse impacts on the health sector as a result of climate change:

- Information about the risks to health within and between populations sections
- Information about the particular vulnerabilities of communities
- Information on health protection, response and adaptation strategies
- Information, e.g. as part of a decision support system, on local weather forecasts
- Information on disease dynamics and responses to outbreaks and epidemics
- Information to underpin health-response activities, both for short-term season-to-season responses, as well as longer-term strategies to cope with extreme weather and dramatic climate-induced changes.

One information-related challenge lies in the generation of reliable and relevant information. Unless local research and analytical capacities are established, many local responses to climate change will remain uninformed, and/or will continue to rely on non-specific regional trends.

Another information-related challenge lies in the dissemination of information, which is about ensuring that the necessary information is available in the right place at the right time, and remains accessible. Mechanisms to ensure that the lessons of past health responses can be learned are essential. Here, the establishment of a national health database, possibly similar to the UK Climate Impacts Programme database and the UNFCCC database on local coping strategies, are important tools, and their development should be pursued.

Increasingly, policy responses to the public health effects of climate change – including the dynamics of the malaria burden in Namibia – will have to be formulated in conditions of uncertainty. The unavoidability of uncertainty is a consequence of the multi-faceted and often highly unknown nature of the interplay between climate change and health outcomes. Yet despite such uncertainty, targeted information provision will have to take place, and if well-executed, will significantly assist the country’s health response in meeting new and emerging challenges.
2.6.3 Develop scenario-based planning

Climate change presents a real threat to global health and wellbeing. Namibia cannot isolate itself from the effects of climate change, and is likely to experience a variety of severe climate-related changes. Malaria in Namibia is already considered a key public health concern. For people living in poverty, and/or lacking access to those public health amenities that people in industrialised nations take for granted, climate change will imply an additional burden that retards development. Yet despite this gloomy outlook, there is no certainty on how climate change will affect Namibia, where specific impacts will be felt most, and how the health sector in general and Namibia’s malaria control efforts are going to be challenged the most.

It is unlikely, even using cutting-edge climate models, that policy makers and/or decision makers in the country’s health sector will be presented with a clear-cut synopsis of what to expect and plan for in the coming 5, 10 or even 50 years. Waiting for such information to become available is likely to waste precious time too. Rather, policy makers will increasingly have to rely on regional forecasts and lessons learnt, suitably augmented by empirical data that field-based health workers stationed at the pulse of communities collect.

One proven and cost-effective method to integrate the often disparate pieces of information into a more manageable perspective of the future is to use scenario development. Such scenarios are best compiled using both qualitative and quantitative inputs, and lead to hypothetical storylines of the most likely future developments. As an example, one such scenario could consider the effect of repeated future flooding in north-central Namibia, and seek to develop response measures that minimise adverse health repercussions while remaining financially viable.

It is therefore recommended that scenario developers from a variety of professional backgrounds are recruited to participate in such health-related scenario developments, to ensure that the multitude of health as well as non-health related effects and impacts which any future scenario will have to take into account are adequately incorporated.

Decision making based on hypothetical future scenarios is not the same as planning for next year’s budget, and can therefore not be expected to reach the same level of spatial and temporal resolution that is routinely required for planning purposes. However, when contemplating the ways in which the national response preparedness can be strengthened for the uncertain impacts that climate change will exert on the sector, scenario development is a potent tool to apply when contemplating the future and how to best respond to its many new challenges.

2.6.4 Strengthen national response policies

As Namibia’s climate becomes more volatile, extreme weather events become more likely. Climate extremes are nothing new, and Namibia has a long history of extreme droughts, interspersed by floods. The country’s future is likely to see more of such events. Extreme
events are particularly risky as they are seldom anticipated, and may occur at times when local or regional circumstances and the ability to respond are sub-optimal. This renders the understanding of extreme weather events both a political as well as a health-related phenomenon of significant importance.

Current knowledge of the health effects of extreme climatic events is limited by data availability and analyses, and few epidemiological and longitudinal studies are in place to learn from (see for example Keim, 2008). Despite such information gaps it will be important to formulate appropriate policies to quickly and decidedly act when such events occur. Such policies need to identify the most appropriate actions and approaches for reducing extreme-event disaster risks, their associated health effects, and the most important actors and chain of command. Such policies require pragmatism, and the application of the precautionary principle: even though we do not know when an extreme weather event will be upon us, we should still be prepared for it.

National policies to effectively respond to emergency situations need to be based on reliable science, and be action- and responsibility-oriented. To better plan for and prepare the nation’s health system for extreme weather events requires good weather forecasting abilities, as well as the integrative and interpretive skill to deduct the timescales, spatial distribution and general impacts of such events.

In regard to health-related impacts, the existing demographic profile and vulnerabilities, the broader social realities and particulars of the extreme event will determine the type and pace of a particular response. Some extreme events will only allow last-minute preparations, in which case existing response processes need to be in place and ready to be called upon. Others, particularly those associated with well-known (yet often poorly understood) climatic events (for example the recurring El Nino phenomenon) have the benefit of announcing themselves long before they have an impact on communities.

### 2.6.5 Develop health-centered adaptation strategies

Developing and implementing suitable adaptation strategies can reduce the severity and impacts of long-term climate changes and severe weather events. In this context, adaptation is understood to be the deliberate gradual adjustment of the way that individuals and institutions plan for and react to climate change. For the health sector, adaptation should include a combination of local and national strategies to ensure that individuals and institutions make provision and adjust their management and decision making processes to decide on and effectively cope with external stressors.

In the context of the public health sector in general, and the control of malaria in particular, a pre-requisite for adaptation to climate change is the monitoring of disease dynamics and mortality, and the interpretation of such empirical findings in the light of climate-relevant models. For example, bi-annual surveys may no longer be sufficient to conclude whether specific control measures did indeed show the desired outcome. Mere data collection without correlating such to climate data and regional climate models may not yield the desired
insights either. To adapt to the effects of climate change requires that management processes in particular become responsive to changing needs, and do not merely remain focused on those aspects that have traditionally enjoyed a great deal of attention. Dynamic disease surveillance systems are required, and their results need to be taken into account when budgeting and planning for the next season and budget cycle.

National emergency monitoring efforts and health-related early warning systems are often out of step with one another. This should not be the case, as they fulfil a complementary role and could, if properly configured, contribute to inform policy makers on how to most effectively introduce adaptation measures and programmes to address existing disease burdens in different communities. As such, health-related early warning systems can reduce the risk of future epidemics whilst increasing the local adaptive capacity – in many countries this is seen as a most cost-effective method to achieve two often disparate goals. What is required is that national adaptation strategies take health-related imperatives into account, while preventative health planning needs to optimally integrate into such adaptation plans.

2.6.6 Climate-proof the public health system

The Namibian public health system is faced by a number of critical challenges, and climate-related changes are likely to increase the demands on existing structures and programmes. Malaria is not the only focus point of the country’s public health system, and is unlikely to become the number one focus in future.

Improving the national public health system, while at the same time strengthening the capacity to be able to adequately respond to emerging needs (e.g. a cholera epidemic in north-central Namibia) remains a key challenge. While it is unrealistic to address the multitude of issues that should be put in place to climate-proof the Namibian health system in the context of this chapter, the following activities would contribute towards ensuring that the national public health system is becoming ready for the impacts of climate change:

- enhance the flow of information between departments and regions
- improve the cooperation between different departments and regional structures
- improve the pace of decision making by decentralising decisions as far as possible
- improve early warning and predictive (especially forecasting) abilities
- enhance the transparency of budget allocations
- improve local capacity building opportunities for staff
- improve the data collection and analysis capabilities
- incorporate climate change-related aspects in planning
- ensure quicker turn-around times in surveys and sampling/surveillance efforts
- promote research activities and cross-disciplinary exchanges
- incentivise trial-based empirical studies, especially in relation to adaptive climate-related epidemiology.
Climate change will affect Namibia’s health system. It is very likely that the national health system as a whole will be exposed to numerous new and additional stressors and challenges in future. Such challenges, if not managed prudently, will result in adverse health outcomes, the decline of effectiveness and spiralling costs. At the heart of meeting new challenges is a robust management system that realises its own strengths and weaknesses, and is given the means and independence to respond to new and evolving challenges.

The health sector is well-advised to take note of the systemic effects that climate change is likely to exert on the sector, and the Namibian population as a whole. Meeting such challenges will be tough, but can be achieved when health care processes are cognisant of the changing nature of the context in which such services will have to be rendered in future. The impact of any disease extends far beyond the health of its victims. A failing health system, for example as a result of inadequate preparation for the effects of climate change, can destabilise the country’s economy. Pro-active climate-proofing the sector is one step to prevent this from happening.

**2.6.7 Strengthen water and sanitation systems**

While efforts to mitigate the effects of climate change will most likely be stepped up in future, it will take many decades before such measures will turn around the effects of a changing climate. Understanding and pro-actively managing the negative health effects brought about by climate change cannot be postponed. Such efforts are especially relevant at the nexus between climate change, human health and water systems. Of note is the 6th Millennium Development Goal, which recognises this important touch point by stressing the need for better water management to reduce mosquito habitats and malaria transmission.

In a dry and water-scarce country such as Namibia, achieving positive health-related outcomes is synonymous with providing adequate water and sanitation facilities. The occurrence and spread of malaria is inextricably linked to the presence of water (IPCC, 2008; Arnell, 2004). This makes water management, including the management of flood waters, and sanitation systems (especially those in flood-prone areas), a topic of great relevance in the control of malaria. But, while Namibia’s water resource and infrastructure management is well-developed, especially when compared with those of other developing nations, there seems to be a lack of planning that incorporates climate change predictions. And while some water and sanitation engineers are undoubtedly thinking about climate change today, little information is shared with the decision makers in the country’s health-sector. Yet, from the point of view of planning for future water and sanitation infrastructure, and the associated climate- and health aspects that such infrastructure will bring about, a much closer collaboration is essential. An important role is also played by town and regional planning, and the relation and impact that climate change will have on new infrastructure.

The management of future water resources depends on the local impact of climate change, both in terms of scope and severity. This also implies that water modelling will have to take a more volatile climate into account when planning for future water and sanitation
infrastructure and services. Here, a topic of importance to the health-oriented decision maker will be how such new infrastructure will create opportunities for the spread and occurrence of malaria, and other infectious diseases. How should such joint challenges be managed? Similarly for sanitation systems: are the systems designed today ready for a changed climate, i.e. climate-proof, and what does their design imply for the spread of infectious and vector-borne infections?

It is therefore recommended that water-resource managers and policy makers actively incorporate regional and local climate projections into their planning. While historical climate and hydrological data have been used in the past to plan for the infrastructure we live with today, tomorrow’s decision making is bound to take place in an environment of greater uncertainty. Here, improved data collection and modelling will be useful to guide decision making, but the very nature of decision making under climate change will be fundamentally different. Making decisions under greater uncertainty will be of increasing relevance to health planners and policy makers alike, just as it will be essential for the water and sanitation planner and their policy makers. Joining hands to envisage climate-proof water and sanitation systems will allow for the design of future-oriented infrastructure that delivers water and sanitation services without causing undesirable health outcomes.

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SECTION 3:

Climate change and water in Namibia

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3 Climate change and water in Namibia

3.1 Introduction

This chapter investigates options to address water scarcity through water supply-side and water demand-side interventions within a framework of integrated water resources management (IWRM), in a context of an ever-increasing demand for water and examines ways and means of how to best involve different stakeholders and different sectors of the economy.

Information for this study was gathered through literature study and consultations with key stakeholders in water resources management. The following documents were reviewed, both to assess the impact that climate change is likely to have on the water sector in Namibia, and to understand how the country can overcome its current water scarcity to meet its future water demand.

- Namibia Zarogoza Expo 2008 booklet (NamWater)
- Sharing water Southern Africa (John Pallet)
- The Vulnerability and Assessment study (DRFN)
- Water demand management situation assessment and strategy (Ben van der Merwe)
- Review and assessment of existing situation (IWRM Plan Joint Venture)
- The assessment of resources potential and development needs (IWRM Plan Joint Venture)
- Namibia’s water decision makers guide (DWA and DRFN)

In addition, representatives of the following institutions were interviewed, to get insights on the current water resources management situation and intentions to address water scarcity in light of climate change:

- Ministry of Agriculture Water and Forestry
- Namibia Water Corporation (NamWater)
- Habitat Research and Development Centre
- City of Windhoek
- Kuiseb Basin Management Committee
- Iishana Basin Management Committee
- Water Point Committees (Onashiku and Endola)

3.2 The water sector and Namibia’s climate

Namibia is one of the driest countries south of the Sahara. The climate of Namibia is a consequence of the country’s location on the south-western side of the African continent, situated at the interface between different climate systems. The climate is influenced by the country's proximity to the northward flowing Benguela current, which brings cold water to
its western shores. The climate of the northern part of the country is influenced by the Inte-
Tropical Convergence Zone (ITCZ) and the Mid-Latitude High Pressure Zone (MLHPZ),
while the southern part of the country lies at the interface between the MLHPZ and the
Temperate Zone (Hutchinson 1995). The different seasons experienced in Namibia are driven
by the northward and southward movements of these zones, in response to the apparent
movements of the sun.

The cold water from the western shores (Benguela current) is advected from the south and is
partly driven by a high-pressure system over the South Atlantic. The combination of cold
water and high pressures leads to subsidence of cold dry air over much of the country which
commonly suppresses rainfall. This situation is dominant during most of the year, except in
summer when heating of the continent is greatest and the southerly position of the Inter
Tropical Convergence Zone (ITCZ) draws moisture and rainfall from the tropics over northern
and eastern Namibia. Therefore, the ITCZ and the Temperate Zone bring rainfall, while the
MLHPZ brings drier conditions. The movement of the ITCZ towards the south during the
Namibian summer results in the rainfall season, normally starting in October and ending in
April. In the far south, the Temperate Zone is moving northwards during the winter, resulting
in the winter rains that often occur in the far south-west of the country. Small variations in the
timing of these movements result in the considerable differences in the weather experienced
in Namibia from one year to another.

The critical climatic factors that have potential influences on water resources are described
below.

### 3.2.1 Rainfall

The key water resources in Namibia, i.e. surface and groundwater are directly dependent on
rainfall. Rainfall is the most variable of the meteorological elements, both in time and space.
It is well known that the distribution of rain over time and space is much more variable in dry
climates such as in Namibia, in comparison to wetter climates. Due to the fact that Namibia is
heavily dependent on rainfall as the main source of water supply, the country has adopted
several mechanisms to deal with the natural variations in rainfall. These mechanisms are
described in section 3.2.

As can be seen from Figure 3-1 below, the north-eastern parts of the country receives the
highest rainfall, normally just above 700 mm per annum. The rainfall isohyets generally
follow a gradient from the north-east to the south-west, with decreasing rainfall from the
north-east to the south-west. There are exceptions from this general pattern, e.g. the maize
triangle of Tsumeb, Grootberg and Otavi receives more rainfall than would be expected in
that geographic location. The reason for this is the undulating topography, giving rise to
orographic rainfall. On the other hand, the coastal zone receives almost no rainfall at all.
3.2.2 Average Temperatures in Namibia

Namibia is characterized by high temperatures. Apart from the coastal zone, there is a marked seasonal temperature regime, with the highest temperatures occurring just before the wet season in the wetter areas or during the wet season in the drier areas. The lowest temperatures occur during the dry season months of June to August. Mean monthly minimum temperatures do not, on average, fall below 0°C. However, several climate stations in the central and southern parts of Namibia have recorded individual years with negative mean minimum monthly temperatures, and individual days of frost occur widely. The high temperatures increases evaporation from the surface water sources such as dams.

3.2.3 Evaporation

From a hydrological point of view, Namibia is truly an arid, water deficit country. Evaporation varies between 3 800 millimetres per annum in the south to 2 600 millimetres per annum in the north. Over most of the country, potential evaporation is at least five times greater than average rainfall. From this, it is evident that those areas where rainfall is at a minimum, the evaporation is at a maximum.
In Figure 3-2 annual average potential evaporation in Namibia is presented. This is an important consideration in the annual water balance, for example for dams and other water related works and activities.

Figure 3-2: Map showing average annual evaporation in Namibia. Source: Mendelsohn et al. (2004)

### 3.2.4 Potential evapotranspiration

In areas of water deficiency, Potential Evaporation or Potential Evapotranspiration (PET), defined as the amount of water which would evaporate from the soil and transpired from a standard vegetation provided there is an unrestricted amount of water in the soil, is an important measure, usually calculated in the unit of rainfall, i.e. mm.

The PET depends on several meteorological elements, i.e. air temperature, air humidity, wind speed and solar radiation. The minimum PET occurs in the months of June and July, due to the lower air temperatures during the winter months. During the growing season the PET is rather high, with values as high as 200 mm per month in the north and central areas and 250 mm in the south of Namibia. This illustrates the severe climatic constraints on agriculture and other activities depending on water in Namibia.
3.2.5 Wind

Wind speeds are generally low in Namibia, only at the coast do mean wind speeds exceed three metres per second, and it is only at isolated climate stations in the inland, e.g. Keetmanshoop, where the mean wind speeds exceed two metres per second. These winds, and the occasional stronger gusts, do not cause any real problems apart from some wind erosion in the drier parts of the country during the driest part of the year. However, wind does affect the water requirements of crops and should therefore be considered when, for instance, irrigation schemes are designed.

3.2.6 Humidity

Relative humidity, defined as the amount of moisture in the air compared to the maximum that the air can hold at that temperature expressed as a percentage, is the most commonly used measure of humidity. Away from the coast, relative humidity averages between 25 and 70%. The humidity does change over the seasons with the dry season being less humid than the wet. However, the difference is not excessive due to the lower temperatures during the dry season. Humidity also influences the water requirements of vegetation and should be considered when designing watering systems.

3.3 Predicted impacts of climate change on the Namibian water sector

The predictions for Namibia are that temperature will increase throughout the country, both in summer and winter, more so in the east than along the coast. Maximum summer temperatures in the east could increase by as much as 3°C or more (DRFN 2008). This will lead to a significant increase in evaporation, as it has been estimated that for every degree increased, evaporation will increase by 5%. Increased evaporation and losses due to evapo-transpiration will result in even less water being available for recharge and surface storage. Increased evaporation will decrease the length of inundation of seasonally flooded wetlands, and may lead to increased salt content of pans and pools. Increased temperatures will also lead to increased transpiration from plants, which will result in more groundwater and surface water being used by plants. The overall effect of this will be reduced size and productivity of many wetlands.

It was stated that today already as much as 83% of the rainfall evaporates before or just after reaching the ground. With increasing temperature the evaporation losses will increase, which can lead to less water being available as run-off. Decreased run-off will lead to less water recharging the groundwater. A lowering of the groundwater table will decrease available water for the vegetation and is likely to result in die-off of some vegetation. Ephemeral rivers are dependent on sporadic floods not only for groundwater recharge but for recruitment of young trees before their roots reach the groundwater. Decreasing frequencies of floods threaten to disrupt this, resulting in less recruitment of riverine vegetation.
Changes in rainfall patterns are not so clear and vary for different regions of Namibia. The general prediction is that rainfall will decrease by 10-20% in southern Africa (De Wit and Stankiewicz 2006). If this happens then it will seriously affect all inland wetlands, the recharge of groundwater and surface storage in dams, as they all depend on rainfall to be recharged. The predicted decrease in rainfall will lead to decreased run-off, which affects the groundwater aquifers, ephemeral river systems, springs, flood plains and pans. One effect of this is that pans and other surface storage impoundments will not hold water for as long as today, or might not fill at all, as drought conditions will probably also increase (DRFN 2008).

To assess the possible impacts of decreasing rainfall in northern Namibia, future patterns of rainfall over Zambia and Angola have to be considered. According to De Wit and Stankiewicz (2006) a reduction of 20 to 30% in annual perennial drainage can be expected over this area. This would reduce the area of flood plains inundated each year in northern Namibia. Smaller and shallower flood plains would dry out earlier, which could disrupt agricultural systems in northern Namibia, presently depending on surface water. The rivers most likely to be affected by decreasing flow from Angola are the Kunene and the Cuvelai systems. A decrease of 20-30% in the Kunene, if coupled with increased extraction of water to meet increasing water demands in central northern Namibia could have a negative effect on this river system. Any future dams built in Angola will reduce the availability of water even more.

Rainfall in northern Namibia is also predicted to start later and end earlier, with an overall decrease in the duration of the rainfall season. The Cuvelai wetlands are recharged partly by local rainfall and partly by run-off from rainfall in Angola. With both decreasing run-off and rainfall there could be serious impacts on these wetlands. Increased summer temperatures would lead to increased evaporation and possible increased salt content in the oshanas.

In southern Namibia it is predicted that winter rainfall will decrease in the south west, the area presently receiving rainfall during the winter months. The impact of decreasing winter rainfall will mainly be on the local fauna and flora. However, the Orange River would be affected by the reduction in rainfall over the eastern part of South Africa, which will lead to reduced river flow in the lower reaches of the Orange, along Namibia’s southern border (De Wit and Stankiewicz 2006).

Although there is a strong correlation between rainfall and groundwater recharge, recharge to groundwater systems is difficult to measure. A large number of factors determines the rate of recharge of groundwater, e.g. rainfall intensity, soil conditions, soil moisture, the slope and gradient, vegetation cover, land use, depth of water table and characteristics of the underlying aquifer. This means that the same rainfall event can produce different amounts of recharge, not only for different hydro-geological environments, but also within similar zones (Christelis and Struckmeier 2001). Groundwater systems also respond more slowly to climate change than surface water systems as they have a longer lag time than surface water systems. Due to all these uncertainties, it is difficult to make general statements about the vulnerability of groundwater systems to climate change.
However, on the global level attempts have been made to model the impact of climate change on groundwater recharge. The models predict that groundwater recharge in major parts of south-western Africa, including Namibia, is projected to decrease by more than 30%. There is of course a considerable degree of uncertainty between different models, with predictions ranging from a decrease by more than 70% to less than 30%. In line with these results, scientists agree that a decline in groundwater recharge and resources would be expected over the semi-arid and arid regions of southern Africa under present climate change predictions. These general indications are based on basic rainfall/recharge relationships as a first attempt to assess the impact of climate change on groundwater resources.

It is predicted that increasing global temperatures would result in decreasing precipitation over the central continental regions of southern Africa, which in turn would lead to decreasing recharge rates and therefore to depletion of groundwater resources. However, such general relationships between annual rainfall and recharge obscure the fact that climate change not only affects the volume of rainfall, but also the frequency, duration and intensity of rainfall, which also influences the rate of recharge. The frequency of rainfall events will affect the soil moisture conditions, as well as vegetation cover. The interaction of these factors is location specific and therefore very difficult to predict.

According to DRFN (2008) climate change is likely to affect water resources by increasing the demand for water, changing surface water and stream-flow regimes (e.g. flooding as experienced at times in the Karas region) and through possible effects of groundwater, e.g. increasing depth of the water table and decreasing water quality. Water demand of livestock is strongly related to temperature and is therefore likely to increase as temperatures rise in the future. The cost of water supply on Namibian farms is already high and increasing depth to the water table will not only result in higher fixed costs for drilling but also increase the cost of pumping the water.

It is also predicted that recharge of farm dams could be negatively affected by climate change in areas where lower precipitation is predicted. One effect of higher temperatures and lower flow intensities is an increase in blue-green algae blooms and an increased salt content of the water. The latter would raise the water demand from stock. On the other hand, the potential increased rainfall intensity predicted for the northern parts of Namibia could increase the frequency of flood conditions, which would increase the run-off and improved recharge of surface storage, e.g. farm dams.

### 3.4 Current water supply in Namibia

Historically, people settled where water was found throughout the year, or moved their livestock between places where water was temporarily available. During the 1900s people learned to transport water from place to place, to dam ephemeral rivers and to tap groundwater to support domestic, agricultural and industrial activities. Throughout most of the century, these various water sources were increasingly exploited to promote development throughout the country, wherever people decided to settle. Often the sites originally selected for settlement were places where water was naturally available, but not necessarily in
sufficient quantity to support growing populations of people and livestock, urbanization and increased industrial activities (Heyns 2008).

As a result of growing demand, water authorities turned to increase the supply of water where and when it was required. Only late in the century did people begin to recognize that water is the primary limiting factor to development in Namibia and that water supply cannot continue to be expanded indefinitely to meet ever demand. In the late 1990s Namibia adopted the Integrated Water Resources Management approach as a way to safeguard water resources and to allow for stakeholders involvement in water development and management.

In Namibia, the primary sources of water supply are perennial rivers, surface and groundwater (alluvial) storage on ephemeral rivers, and groundwater aquifers in various parent rocks. Additionally, unconventionally water sources have been adopted to augment the limited traditional sources.

### 3.4.1 Surface water

Namibia's surface water resources can be divided broadly into two types, those derived from perennial systems and those derived from ephemeral (seasonal, non-permanent systems). In the latter group are included all the wetland areas and man-made storage dams on or associated with the sporadic flows of ephemeral rivers as well as pans, pools and other wetlands derived from local runoff.

<table>
<thead>
<tr>
<th>Perennial source</th>
<th>Estimated potential yield Mm$^3$/a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kunene (at Ruacana)</td>
<td>5 500</td>
</tr>
<tr>
<td>Okavango (at Mukwe)</td>
<td>5 000</td>
</tr>
<tr>
<td>Cuanda (at Kongala)</td>
<td>10 000</td>
</tr>
<tr>
<td>Okavango (at Rundu)</td>
<td>1 300</td>
</tr>
<tr>
<td>Zambezi (at Kalima Mulilo)</td>
<td>40 000</td>
</tr>
<tr>
<td>Orange (at Noordoewer)</td>
<td>11 000</td>
</tr>
</tbody>
</table>

(Source: developed from information contained in Zaragoza booklet, NamWater 2008)

With the exception of short lengths of the Okavango and Kwando Rivers in the north-east of Namibia, all the rivers in Namibia's interior are ephemeral. The potential of ephemeral surface water is limited because they rely directly on variable (often low) rainfall. The water can therefore only be harnessed during the rainy season. It is estimated that the sustainable yield from the dams on ephemeral rivers is at least 200 cubic meters of raw water per annum. To date, Namibia has constructed about ten such impoundments on these rivers. The total storage capacity of these impoundments is 665 million cubic meters, but the 95% assured safe yield is only 87 cubic meters, which is an indication of the low efficiency of surface
water storage facilities in arid environments. The use of water from perennial rivers is subject to negotiations with other riparian states. The estimated potential yield from these perennial rivers is presented in Table 3-1.

### 3.4.2 Groundwater

In arid areas, where rainfall is limited and surface runoff is only available during the rainy season, groundwater becomes a very important water source. Like surface water sources, groundwater can also be regenerated and replenished by rainwater filtering into the ground. The magnitude and sustainable yield of the groundwater sources are therefore determined by the size and extent of the aquifers, the conditions that facilitate the rate of recharge to the aquifers and the potential of the hydro-climate to produce rainfall and runoff.

In addition there are also fossil groundwaters that have accumulated over tens of thousands of years in water-bearing aquifers when the climate in the southern African region was much wetter and a large lake covered areas in northern Namibia and southern Angola where the Cuvelai Basin is located.

More than 150,000 boreholes have been drilled in Namibia to find water and to understand the hydrogeological environment. The number of boreholes in use today are about 40,000 and 46% of water used in the country comes from groundwater. It is estimated that the sustainable yield of the useable groundwater sources in the country is at least 300 million cubic meters per annum.

### 3.4.3 Other sources

It is estimated that the existing facilities to utilize unconventional water resources can yield about 10 million cubic meters per annum, but there is much more potential still to be developed. Current unconventional sources include recycling of water in industrial processes, the reuse of water for industrial and irrigation purposes, the reclamation of domestic sewage effluent to potable water quality standards, artificial recharge of groundwater resources and desalination.

### 3.5 Current and future water demand in Namibia

For the purpose of this study water demand is considered in terms of Vision 2030 which defines the national development goals until 2030, population growth and it is further analysed according to the different water use sectors i.e. urban, rural domestic, irrigation, livestock, mining and tourism. This section also describes the possible impacts of climate change on water demands.
3.5.1 Vision 2030

Vision 2030 defines the development goals of Namibia by 2030 as follows: “A prosperous and industrialised Namibia developed by her human resources, enjoying peace, harmony and political stability”. Some of the main development targets of Vision 2030 include:

- 80% of GDP from services and processed goods;
- Processed goods 70% of export; and
- Unemployment less than 5%.

To achieve these three targets, it implies that there will be a substantial increase in the population and, based on a medium growth scenario, will reach 2.998 million in the year 2030 (IWRM Plan Joint Venture, 2009). To achieve the targets set for Vision 2030 average economic growth rates of 6 to 7% must be achieved until 2030 (IWRM Plan Joint Venture, 2009). While high rainfall variability and the accompanying threat of droughts are the most critical constraints facing Namibia’s water resources, water demand continues to rise. As a consequence, water scarcity has become a problem for all areas that are placed geographically far from the perennial water sources.

The Department of Water Affairs and Forestry (DWAF) has estimated that the country’s developed water sources are able to supply a total of 600 Mm$^3$ per annum. Based on projections for future water demand (estimated to grow at 2.2% per annum) these developed sources are likely to be fully exploited by 2016. Even if stricter Water Demand Management practices are enforced, the central areas of Namibia (in particular the high growth points in the Khomas Region) are expected to experience full use of currently developed sources by 2012.

Over the next 30 years, water demand in Namibia will increase rapidly in some areas (in particular, all expanding urban areas) and only moderately in others. The current problem of distributing the available water to where it will be most needed, will be exacerbated and, due to full exploitation of developed resources, expensive new water sources (for example desalination plants, new dams and long pipelines) will have to be developed.
3.5.2 Population

Figure 3-3: Population Density Map per Water Basin

Figure 3-3 is a population density map of Namibia based on the 2001 population figures estimated for the enumeration areas used in the census. The map clearly shows which basins support large numbers of people, and which are sparsely populated. The most sparsely populated areas are shown in white while the areas where population concentrations are at their highest are also clearly evident.

3.5.3 Water demand by sectors

Figure 3-4 below shows the estimated water demands by sector for 2008 and Figure 3-5 indicate estimation for 2030. These demands exclude water from unconventional sources. It is estimated that by 2008 the total water demand in Namibia was 327 Mm$^3$ per annum. By 2030 demand for water will have increased to 765 Mm$^3$ per annum.

The agricultural sector is the major user of water in Namibia. In 2008 irrigation accounted for 41% of the total water demand. It is expected that water demands for irrigation will increase to 65% by 2030. The increase in water demand by 2030 for the mining sector does not seem to be that significant. This is because the graphs below do not give an indication of water requirements from unconventional sources. Although it is expected that there will be an
increase in mining activities, particularly uranium mines, these mines will rely mainly on desalinated water.

Figure 3-4 Total water demand in Namibia in 2008 (source: IWRM Plan Joint Venture (2009))

Figure 3-5: Estimated water requirements in 2030 (source: IWRM Plan Joint Venture (2009))
3.6 Water resources management

The administration of water resources in Namibia are governed by the Constitution, the National Water Policy, Water Supply and Sanitation Policy, water law and water regulations promulgated in terms of water legislation.

The water policies and legislation referred to above were as a result of the water sector review process which the government initiated in 1998. The intention of the review was to move the focus of the water sector from purely water supply towards an integrated water resources management approach.

3.6.1 Policy and legislation

The Republic of Namibia initiated a process to review the water sector in the early 1990’s, just after independence. At the initiation of the review the water sector was administered through the Water Act of 1956. This Act of 1956 still holds to date because the Act of 2004 has not commenced. The Water Supply and Sanitation Sector Policy (WASP) was the first sectoral policy to be adopted in 1993 after independence. WASP had four overall goals; namely:

- To make essential water supply and sanitation services accessible to all;
- To achieve equitable improvement of services through combined efforts of the government and the beneficiaries based on community involvement, community participation and the acceptance of a mutual responsibility;
- To provide opportunities for communities to participate in decisions regarding water supply and sanitation solutions and services and for communities to contribute to the cost for services and;
- To achieve the above goals in an environmentally sustainable manner

The WASP had a very strong focus on water supply and provision sanitation services and little to do with water resources management. For this reason, a formal Namibia Water Resources Management Review process was established leading to the National Water Policy that was adopted in 2000 with the aim of addressing water resources management. This policy was formulated at the time of global paradigm shift towards integrated water resources management (IWRM). The policy adopted the IWRM approach for water resources management in Namibia. Following this policy, the Water Resources Management Act no. 24 was promulgated in 2004 (even though it has not yet commenced). Unfortunately the Act as originally formulated could not be put into practice and therefore is currently being reviewed. Regulations for implementation are being formulated concurrent to the revision of the Act.

The Act provides legislative alignment between water supply/sanitation services and resource management. In agreement with and supporting the National Water Policy and Act, Namibia is a signatory and ratified the RAMSAR Convention on Wetlands, Convention on the law of the non-navigational uses of international water courses, SADC Protocol on shared water systems as well as the UN conventions to Combat Desertification, on Biological Diversity
and the Framework Convention on Climate Change. Since the country shares all its perennial rivers with its neighbouring countries, transboundary cooperation is important and both the National Water Policy and Act address transboundary water management. Namibia is a member and a signatory to the Zambezi Commission (ZAMCOM), Permanent Okavango River Basin Commission (OKACOM), Permanent Orange-Senqu Commission (ORASECOM) and it is represented on the Permanent Joint Technical Commission (PJTC) for the Kunene River.

The Water Supply and Sanitation Sector Policy (WASP) of 1993 was reviewed in 2008, to incorporate new development in the water sector and to better address gaps particularly on sanitation. The Government recognised that it was doing well in terms of realising its water supply goals whereas the sanitation targets were lagging behind. The revised Water Supply and Sanitation Sector Policy (WSASP) was adopted in 2008 and it replaces the 1993 policy.

In addition to the above, there are several other pieces of legislation and policies that support and have relevance to the water law and policies. These include:

- the Constitution of the Republic of Namibia,
- Environmental Assessment Policy, 1996;
- Environmental Management Act, 2007 (not yet commenced)
- Decentralisation Enabling Act, Policy and relevant implementation instruments
- The National Strategy for Rural Sanitation, 2004
- Green Scheme Irrigation Policy, 2005
- Local Authorities Act (No. 23 of 1992)
- Regional Councils Act, (Act No 22 of 1992)

### 3.6.2 Water resources management institutions

The Department of Water Affairs and Forestry (DWAF) in the Ministry of Agriculture, Water and Forestry (MAWF) is overall responsible for water allocation and water resources management. Arising from the new Water Supply and Sanitation Sector Policy in 2008, DWAF also has the overall coordination responsibility for sanitation. The department is divided into three directorates, the Directorate of Resource Management, the Directorate of Rural Water Supply (DRWS) and Directorate of Forestry (DoF). The DoF has indirect influence on water resources. Also, within MAWF is the Department of Agriculture that has indirect influence in water resources management as it is mandated to advise on the development of farm dams, irrigation schemes and soil conservation practices.

Even though, water supply and resource management institutions are presented separately below, cognisance is given to the inter-linkages and dependencies between the two functions.
3.6.2.1 Water supply and sanitation institutions

The Water Supply and Sanitation Policy (WASP) of 1993 recommended several institutional changes to enhance supply of water throughout the country. It recommended the formation of a bulk water supplier and a directorate within DWAF to deal with water supply to communal rural areas. It also allocated responsibilities for other water supply and sanitation functions such as on private land, government institutions and towns.

The WASP led to the establishment of Namibia Water Corporation (NamWater) as a State Owned Enterprise based on the Namibia Water Corporation Act, 1997 (Act 12 of 1997). Since its establishment, NamWater provides bulk water to a variety of waterworks and water schemes throughout the country. The Directorate of Rural Water Supply was also formed as following from WASP. NamWater also supplies water to some of the rural water supply distribution network established by the DRWS, particularly in central northern Namibia. The DRWS further on supplies raw water from boreholes direct to consumers and their livestock.

The DRWS established regional offices in 12 of the 13 Namibian regions where communal areas occur. The directorate developed a Community Based Management (CBM) approach as a means to involve communities in water supply. Phase 1 and 2 of the 3 phases of the DRWS CBM strategy have been completed. DRWS has increased rural coverage of access to water to approximately 80% by 2000 (from about 43% in 1990). At the local level, Water Associations and Water Point Committees are established as platforms for communities to participate in decisions pertaining to water supply, maintenance of infrastructure and collection of water fees. Cost recovery from the rural consumers and capacity amongst these local community institutions remain key challenges.

The mandate for rural sanitation in communal areas was allocated to the Ministry of Health and Social Services, a development which was reconfirmed by Cabinet in 1998. The revised WSASP policy of 2008 made a recommendation for the establishment of the Directorate of Water Supply and Sanitation Coordination (DWSSC). This new directorate will address the integration of water supply and sanitation within one sector to ensure coordination amongst all the role players. It is envisaged to encompass the national component of the Directorate of Rural Water Supply and to integrate a complementary sanitation component. It will serve to coordinate water supply and sanitation services in rural and urban areas through the existing institutional structures.

The mandate for urban water supply and sanitation falls under the Local Authorities and Regional Councils who, inter alia, distribute water to consumers supplied, in most instances, by NamWater. Water supply and sanitation on freehold tenure farms and mining companies are the responsibility of the individual farmers or companies at full supply cost recovery but under the coordination and control function of the DWSSC. The Ministry of Health and Social services provides hygiene and health awareness and education on water and sanitation.
3.6.2.2 The Directorate of Water Resources Management in MAWF

The Directorate of Resource Management within DWAF is in charge of assessment of water resource potential, long term strategic planning and overall water resources management including elements of water demand management. The directorate is divided into 5 divisions; namely:

- Geohydrology carries out research and monitoring of groundwater resources and oversees management in controlled aquifers. It provides advice and guidance to the division of law administration that grants abstraction permits.
- Water Environment is responsible for water quality and pollution control. This division is tasked with the assessment, approval and administration of pollution permits for effluent discharge to water bodies. It also assumes responsibility for water awareness activities.
- Water Law and Administration administers and grants permits.
- Hydrology monitors water resources, flood management and oversees basin management institutional development
- Planning is responsible for long term strategic planning, transboundary agreements and resource accounting

All the above mentioned divisions are also responsible for capacity building. NamWater is responsible for the management of all the large dams in the country as well as pipeline schemes that supply bulk water. There are a few cases where the local authorities operate and maintain water infrastructure such as in Windhoek.

3.6.3 Water demand management efforts in Namibia

Water demand management (WDM) is a management approach that aims to conserve water by controlling demand (Pallett, 1997). It is part of an integrated approach towards the sustainable development and use of water resources (Heyns, Redecker & van der Merwe, 1998). It involves implementation of policies for the efficient use of water, for economic efficiency and for environmental sustainability (Heyns, Redecker & van der Merwe, 1998). WDM is aimed at maximising water-use efficiency to derive the greatest value from the available water resources (Chiuta, Johnson & Hirji, 2002). There are various methods and tools to manage water demand, these include awareness raising, regulations though policies and legislation, re-use and recycling.

In the past, Namibia followed the traditional path of providing a water supply through technical and engineering solutions and water was provided at cheap prices to most citizens. This led to a general perception among the public that it is the government’s duty to provide water as a cheap and abundant commodity.

This lack of recognition of the true value of water in an arid country such as Namibia resulted in an inefficient and unsustainable water demand, especially when development needs and population growth created a constant, additional increasing water demand. Opportunities to develop new supply-oriented solutions, such as dams in ephemeral rivers in Namibia, and
water transfers are limited and extremely expensive. By reducing demand, Water Demand Management (WDM) provides an equivalent outcome to supply augmentation. The sustained decrease in water demand is the same as adding the same amount of water through an additional reliable supply source. Implementation of WDM results in a net financial benefit to the supplier as well as its customers. The environment also benefits from the abstraction of less water, reduced consumption of energy to transfer and heat water, and lower pollution load through decreased discharge of wastewater to the environment.

Water Demand Management was incorporated in the National Water Policy. This marked an important change that water planners no longer resort only to supply-oriented solutions, but accept new ways to reduce the actual demand for water in Namibia. Although WDM is also included in the revised Draft Water Resource Management Act there are no legal mechanisms yet in place to advance implementation of WDM within the water sector. Most of the results reflected in this section are based on individual efforts by service providers and or water users in the various water use sectors.

According to Heyns, Redecker & van der Merwe (1998), Namibia’s methods for implementation of WDM are:

- A clear demand management policy and implementation strategy based on sound economic and social principles
- Good water supply operational practices by authorities
- Effective use of water by all consumers
- Maximise water re-use
- Public awareness
- Pricing policy
- Legislation
- Incentives for retrofitting
- Water efficient devices

3.6.3.1 Water demand management in the urban water sector

Of all the urban centres in Namibia, only Windhoek Municipality and Rehoboth have a water demand management policy and strategy which was approved in 1994 and 2003 respectively. A wide range of WDM measures have been classified in Windhoek as issues involving policy, legislation, technical issues as well as public education and awareness. Water demand management efforts in Windhoek were reviewed in 2001 and again in 2004. Even though WDM has proved to improve water efficiency in Windhoek, it is not consistently implemented because efforts are strengthened during drought periods. Recent research shows that there are still some technical aspects that could be addressed in Windhoek such as leakage on private and government properties, pressure reduction and introduction of water efficient showerheads, dual flush toilets and other technical innovations (Van der Merwe, 2009).
In most urban areas the water demand has dropped over the past few years despite an increase in population and economic activities. A few exceptions may be towns such as Tsumeb where the closing of the mine affected the economic growth in the town negatively and consequently led to the reduction in water demand. In the “Bulk Water Supply Infrastructure Development and Capital Replacement Master Plans” conducted by NamWater (most studies are not finalised yet) for the various NamWater supply areas it was determined that in places such as Arandis, Opuwo, Khorixas, Otavi, Otjiwarongo, Aranos, Mariental, Maltahöhe and Ongwediva savings from 20 to 50% may be realised through the implementation WDM initiatives. In most villages high water consumption can be attributed to one or more of the following factors: high losses at government buildings and institutions, inappropriate water tariffs, inefficient administration (infrequent meter reading, poor billing and credit control), low levels of infrastructure maintenance and inaccurate metering.

3.6.3.2 Water demand management in the rural domestic water sector

During 2008 the rural domestic water sector consumed approximately 10.3 Mm$^3$ which represents 3.1% of the total water requirement (van der Merwe, 2009). Up until 1993, supply of water to rural areas has been undertaken through a sense of social justice and as such the government did not recover the costs of water supply. Community Based Management (CBM) of rural water points was instigated in 1993 to encourage water users to become responsible for their water supply by taking responsibility for recovering the water supply operation, and maintenance costs as well as the management of the system. The approach is based on an assumption that water users will use water efficiently if they pay for the services and if they participate in the management of water infrastructure. Studies have also shown that in rural areas the national mean per capita daily water consumption is 9.9 litre/capita/day. The median for urban areas is approximately 83 litre/capita/day. The biggest challenges in rural areas are:

- Proper management of water points;
- Recovery of costs by Water Point Committees to pay NamWater or for the operation and maintenance of the water points;
- Proper maintenance of water infrastructure; and
- Prevention of pollution of water sources.

3.6.3.3 Water demand management in the irrigation water sector

During 2008 the irrigation water sector consumed approximately 135.3 Mm3 which represents 41.0% of the total water requirement (van der Merwe, 2009). The current status of WDM with the irrigation sector can be summarised as follows:

- Only a few irrigation farmers complete the annual returns to DWAF and the actual volumes of water used is unknown;
- Because returns are not completed the over- or under-utilisation cannot be assessed;
- The extent of pollution resulting from irrigation areas is unknown;
- Metering and tariffs for irrigation water are inadequate;
• Information for proper scheduling is inadequate;
• Inadequate information is provided to farmers regarding improved crop yields which are linked to improved irrigation efficiency; and
• Maintenance of both canals and on-farm irrigation systems is inadequate.

3.6.3.4 Water demand management in the livestock sector

During 2008 the livestock water sector consumed approximately 86.9 Mm3 which represents 23.6% of the total water requirement. No significant growth is expected in the livestock sector and the expected water demand will stay the same and will only use 11.3% of the total expected water requirements in 2030 (van der Merwe, 2009). In communal rural areas payment for water is determined by the Water Point Committees. Some charge a fee per head of cattle while others pay a flat rate irrespective of the number of livestock. Commercial farmers use water mainly for stock watering. The farmers are largely responsible for developing and obtaining their own water supplies from groundwater and farm dams and there are no accurate consumption figures available. The scope for implementation of water demand management on commercial livestock farms is limited and most farmers try to lower their input costs (pumping cost) as they do not have any control on the price that they get for their product.

3.6.3.5 Water demand management in the mining sector

During 2008 the mining sector used approximately 9.1 Mm3 which represents 2.8% of the total water requirement. The expected water requirement will increase to 13.8 Mm3 which represents only 1.8% of the total expected water requirements in 2030 (van der Merwe, 2009).

It appears that mines are confronted by economies of scale when it comes to water saving strategies due to the large quantities of water they use. It has become viable for some mines to take unilateral action to save water. Examples include Rössing and Navachab mines, both of which are fairly large and sophisticated and can seemingly exploit economies of scale in water saving techniques, such as large scale recycling.

Since 1977, the amount of freshwater used by Rössing Mine has decreased dramatically from 26 000m3/day (9.5Mm3/a) to 7 500m3/day (2.7Mm3/a) in 1997, this in spite of higher production by the mine. However, the total amount of water used by Rössing has returned to 1977 levels, the freshwater being largely made up by the use of recycled water. The comparison is made in Table 3-2.

It is evident that Rössing Mine finds the water management strategy less costly than obtaining all its water from NamWater. A brief financial cost benefit analysis by Rössing themselves shows that the benefits outweigh the costs by approximately N$67 million per annum (1994) and as such, there are obvious incentives for them to undertake these measures.
Table 3-2: Rössing Example for Water Recycling

<table>
<thead>
<tr>
<th>Source</th>
<th>1977 (Mm³/a)</th>
<th>1977 (%)</th>
<th>1997 (Mm³/a)</th>
<th>1997 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NamWater</td>
<td>9.5</td>
<td>100</td>
<td>2.6</td>
<td>27.66%</td>
</tr>
<tr>
<td>Recycled</td>
<td>0.0</td>
<td>0.0</td>
<td>6.5</td>
<td>69.15%</td>
</tr>
<tr>
<td>Brackish</td>
<td>0.0</td>
<td>0.0</td>
<td>0.3</td>
<td>3.19%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>9.5</td>
<td>9.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Source: van der Merwe 2009)

3.6.3.6 Water demand management in the tourism sector

During 2008 the tourism sector used approximately 19.6 Mm³ which represents 5.9% of the total water requirement. The tourism sector was identified as a high growth sector in Vision 2030 and the expected water requirement will increase to 38.9 Mm³ which represents 5.1% of the total expected water requirements in 2030.

Schachtschneider and Nashipili, (2002) has done an assessment at 6 tourism facilities in Namibia. The water use patterns showed that visitors used between 4% and 20% of all water supplied. Staff consumption, leakage and watering gardens were independent of visitor numbers and made up the bulk of the water used. More recent studies at Okaukuejo and Namutoni concluded that major wastage results from infrequent or no maintenance of plumbing systems especially at the staff facilities. Night-flow measurements were not available but it was estimated that savings up to 40% are possible at both camps. Very few tourism facilities sensitise their own personnel and visitors to improve water use efficiency. Previous campaigns to sensitise tourism operators on water use efficiency seemed to fade away, as very few tourism establishments display signs to improve water use efficiency.

3.7 Mechanisms for stakeholder involvement in the water sector

Stakeholder engagement and participation in the water sector to date is mainly through the establishment of basin management committees and through the processes undertaken by the Directorate of Rural Water Supply (DRWS) such as the formation of water user associations and local water user associations. The role of women in water resources management is central in IWRM; therefore it is also assessed below.

3.7.1 Basin management committees

Namibia is divided into 11 river basins. Basin management committees are established as platforms for stakeholders to participate in water resources management. To date, three Basin Management Committees have been established; efforts towards establishment are ongoing in three others. The Karst groundwater aquifer has a water management body that has similar functions to basin management committees. Due to limited financial and human capacity and to a lesser extent the commencement of the Act; the basin management committees are not yet able to fully carry out their mandates. Nevertheless, the draft Act indicates that a Basin Management Committee will be expected to protect, develop, conserve, manage and control water resources and water resource quality within its water management area; supervise
formulation of IWRM Plans for the respective basins; to make recommendations to the Minister to issue or cancel licences under this Act; to collect, manage and share such data as are necessary to properly manage the water management area in coordination with the Ministry; to determine abstraction charges based on approved abstraction licence volumes with the approved policy in concurrence with the Minister for data collection, resource monitoring and other approved purposes; refer serious water or pollution problems to the minister.

Basin management committees’ members are elected from amongst the basin forum which is composed of all interested parties. Basin forum members are nominated by their institutions, based on the interest of the individuals involved. Representatives in all the existing committees and forums are dominated by men. Women are usually not established in the positions of power that would recommend their nominations. It is difficult to assess the impacts and level of stakeholders’ participation through basin management initiatives because of the slow implementation of the process.

Some stakeholders at local and basin level are of the opinion that basin management provides a platform for information sharing amongst stakeholders but not necessarily opportunities for stakeholders to influence decisions. It is also reported that the majority of participants in basin management committees are government representatives; leaving out the wider audience from the civil societies, private sectors and businesses.

### 3.7.2 Community based water management

Awareness, participation and engagement are key issues for the community based management approach of DRWS in rural communal areas to attain the Millennium Development Goals and Namibia’s Vision 2030. The Mission of the Directorate (DRWS, 2004) states that:

- By 2007, 80% of the rural population will receive water from improved systems and that all water points existing will be managed by the communities themselves.
- The Directorate itself will consist of in-house specialists who will provide advice and services on policy-making, planning and information management.
- The Regional support units will provide project management services, policy advice, training services, management of inter-regional pipelines and will advise and support in water supply operations.

With communities, the focus is on participation, engagement and awareness rising. It is clear from the Vision and the Mission of the DRWS that absence of engagement, by communities as well as national and regional staff, would lead to complete failure of the Community Based Management Programme. Stepping further into the implementation, it is clear that participation of communities, including individuals and their leaders, is also an essential component averted failure of the programme. Without explicitly stating in their vision or mission that awareness, participation and engagement of women and youth is essential, the programme nevertheless targeted men, women and youth in all their activities. The key
concepts of the programme are described as community based, that is operation and maintenance of water points, partnership between government and rural communities, shared responsibilities amongst all stakeholders and decentralisation of decision making and management functions to the lowest level possible.

The review of the Water Supply and Sanitation Policy in 2008 highlighted the success of DRWS in exceeding its targets for water supply to rural communal areas. Part of this success is attributed to the community based management approach. However, at the rural level, there are sentiments that communities are not much involved in decision-making especially regarding the prices of water. In many cases, decisions are made by NamWater and DRWS based on rough estimations and some of the payment systems are regarded as unfair, e.g. where communities pay flat rates regardless of the amount of water used. Often communal water points are closed because not all consumers pay on time; this affects those who have paid. Another challenge is that caretakers are not always close to the infrastructure and when problems occur, e.g. when water pipes burst, it takes long to report and to repair the problem.

Just as with basin management approach, community based management provides a platform for water users to share their opinions on issues of water use, payments and maintenance of water points. Some water point committee representatives indicated that communities also have a chance to advice and share their concerns with DRWS and Namwater through water point committees.

3.7.3 Challenges of stakeholder involvement

Quoting one interviewee: “stakeholder participation is time-consuming and rather an involving process that can be costly if not planned properly. If there is less cooperation or diverse view then it becomes difficult to make decisions”.

Some stakeholders reported that there is no clarity with respect to the benefits accrued through stakeholder participation. Most of the relevant stakeholders do not always understand the concept of IWRM, making it difficult to implement it. It was also reported that although stakeholder initiatives provide information sharing platforms, a challenge is that some people are not able to make use of the information received. Financial shortcomings have also been identified to limit stakeholder participation and engagement. Participation in these committees is voluntary and this also hampers progress of IWRM because most members of these committees are committed to full time-jobs.

Suggestions on how to best engage stakeholders in water resource management:

- Strengthen capacity of stakeholders to understand and to participate in IWRM initiatives (starting with basics in advance)
- Incorporate inputs from the communities in decisions rather than just consulting with them.
- Investigate alternative sources of water, e.g. rainwater harvesting for irrigation. Communities want to see tangible benefits.
• Address relevant community issues such as water payments
• Investigate and implement incentives for stakeholders participation in basin management committees and in water point committees.
• Develop a common vision for all water users at basin or water point level

3.8 Policy recommendations

This section deals with recommendations for sustaining the water sector under present climate variability and predicted climate changes. To date, the water sector in Namibia has adopted and is implementing several mechanisms to deal with climate variability. Most of the people interviewed from the water sector regard climate variability as the greatest factor influencing water availability. This is in line with the predictions of climate change in Namibia; which predicts that the country will experience increased variabilities. Considering this, it seems appropriate to develop strategies now already to adapt to these future harsher conditions.

Although the water sector has adopted several innovative mechanisms to address water scarcity, these practices are not implemented country-wide and often are only enforced during periods of water scarcity such as in times of droughts. Special focus is placed on measures to reduce evaporation and to improve efficiency of the utilisation of water resources. This assessment recommends that Namibia should build on its experience in innovative mechanisms to address water scarcity and expand implementation of such approaches country-wide. These mechanisms should be considered even in “good years” i.e. when there is no extreme water scarcity.

Below are some examples of the current mechanisms in place.

3.8.1 Conjunctive Water Use

 Conjunctive water use means that surface water and groundwater are used together with the aim to minimise evaporative losses. Artificial recharge of alluvial aquifers is one example of conjunctive water use, commonly done by collecting water in a reservoir upstream of an aquifer, resulting in the collected water recharging the aquifer. In central Namibia the Ministry of Agriculture, Water and Forestry as well as NamWater have explored the possibilities of using groundwater resources as a reserve or back-up for the abstraction of surface water sources to allow a higher rate of abstraction from the latter. While maintaining the groundwater as a back-up, surface water is used at a faster rate to reduce evaporation losses and thereby increase the efficiency of the use of the surface water source. This technique has been introduced in the Karst where the Berg Aukas groundwater compartment is regarded as a back-up for water supply to the central areas of Namibia. It has been predicted that this would increase the 95% safe yield of the three dams from 16 to 25 Mm³/annum (Heyns 2007).

Water banking or managed artificial recharge, which has been tested in the Windhoek aquifer, is another example of conjunctive water use. Surface water from the Von Bach Dam
is purified in a water treatment plant and stored underground in the Windhoek aquifer. This result in lower evaporation and overflow losses at the dam and in years that the surface water sources (the three dams providing Windhoek with water) cannot provide enough water; stored underground water can be extracted. This approach uses existing water resources more efficiently and secures a larger supply of water, mainly for Windhoek.

Conjunctive use of the 3-dam system where the pumping of water immediately out of the shallow Omatako Dam into the deeper Von Bach Dam, where evaporation is reduced, also improves the efficiency of the supply sources.

### 3.8.2 Water Demand Management

The main purpose of water demand management is to reduce wastage and to enhance the efficient use of water. This entails reduction of losses and reduction of volume of water used to perform specific tasks, without sacrificing the level of customer service. For instance the use of a low volume flush toilet and an efficient shower head does not influence the level of service to the user. Examples of demand management measures include conservation oriented pricing, reduction of non-revenue water, pressure reduction, water-efficient landscaping, changes in water use practices and public education (NamWater 2007).

Water demand management is central for reducing the non-revenue water in local authorities in Namibia. Presently a considerable number of towns and settlements are experiencing substantial water losses due to leaks, faulty meters, pipe bursts, un-metered and illegal water connections as well as administrative losses (van der Merwe et al. 2005). A recent study conducted by NamWater investigated the potential effects of introducing water demand management in towns and settlements in the central south water supply area. The results indicate that water demand measures can contribute to a reduction in current and future demands by as much as 25% (NamWater 2007). A central measure suggested by the NamWater study is to introduce a conservation tariff, where higher rates are paid by high consumers, which would manage the demand for water. In addition cross-subsidisation of low-income earners by means of a rebate system was also suggested to ensure equitable access to water, as well as to enhance compliance with paying for water by the poorer segments of society (van der Merwe et al. 2005).

### 3.8.3 Groundwater Monitoring and Control

About 45% of the water used in Namibia is abstracted from groundwater. It is therefore important to monitor groundwater levels across the country. The Namibian population is projected to grow to 3 million in year 2030. This, together with an expected expansion of industrial activities is likely to increase the demand for water. There are already initiatives towards monitoring groundwater levels, especially in so called groundwater control areas, defined as more sensitive water resources, e.g. aquifers that are heavily utilized and therefore risking over-utilization, and fossil groundwater resources. Due to the predicted increase of evaporation it is likely that less surface water will be available in the future. This will increase the demand for groundwater. To prevent over-abstraction of groundwater resources,
monitoring should be conducted, not only in the groundwater control areas but throughout the country.

3.8.4 Policy and legal framework

As reported on earlier, Namibia has adopted an integrated water resources management framework which is supported by the National Water Policy, Water Supply and Sanitation Policy as well as the draft Water Resources Management Act. Regulations for the water sector are being developed in parallel to the process of reviewing the Act. The Ministry of Agriculture Water and Forestry currently also oversees a process of developing an IWRM Plan for Namibia. It is intended that the plan will be formulated taking into account the predicted impacts of climate change. As such the water sector provides an enabling environment for IWRM; however the delay in finalisation of the Water Act slows down the implementation of the good intentions in the policies. It is therefore recommended that priority be given to finalise the Act.

3.8.5 Stakeholder engagement

IWRM defines the basin as the level at which natural resources should be managed, based on discussions and negotiations between stakeholders of the basin. To ensure sustainability the basin management approach aims at enhanced functioning of river basins, which should be reflected in a sound relation between people, water, land, fauna, flora and the basin’s ecosystem. The approach encourages participation in decision making processes concerning water resource management in the basin and thereby actively supports the decentralisation of management functions to basin management committees. In this regard Namibia is divided into 11 river basins and the Ministry is in the process of establishing basin management committees.

According to DRFN (2008) the basic concept and rationale of the basin management approach and the function of the basin management committee provides scope for addressing vulnerability to climate variability, climate extremes and climate change, and for development of community based adaptation strategies with stakeholders represented on the committee and the wider stakeholder group. However, it is important to note that the implementation of basin management in Namibia has turned out to be a slow process, with only three of 11 identified basins having established basin management committees and efforts are ongoing in 3 other basins. The slow process is attributed mainly to the lack of a legal framework for the committees and limited technical and financial capacity at the various levels. The following points therefore need attention from policy makers and implementers:

- There is a strong need to strengthen the capacity of stakeholders to understand the benefits of IWRM and how they can meaningfully participate in IWRM initiatives. Experience from the Orange-Fish River basin has shown that one efficient way to do this is to allow the stakeholders to identify their own water resources management and
development challenges and to actively involve them in the identification and implementation of solutions.

- Another key challenge to basin management committees is the capacity to fulfil the functions of the committees as outlined in the Water Act. Experience from all the basins where the approach is piloted and/or implemented has shown that there are limited capacities in all the basins to execute the proposed functions. As a result of the limited capacity, basin management committees are often dominated by government individuals and others that are formally employed, hence giving little voice to local communities. The full time employed individuals often do not have the time to execute functions that are beyond their job descriptions. The assessment recommends that each basin committee should have at least one qualified full time support staff to support the committee in execution of tasks.

- Currently the mandates of basin management committees are still vague (due to capacity gaps and because the Water Act is not enacted). It is recommended that implementation of the Water Act should be fast-tracked so as to support basin management committees.

### 3.9 References


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Section 4: CBNRM & Tourism

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4 CBNRM and Tourism

4.1 Tourism in Namibia

4.1.1 Introduction and Overview

Since Independence in 1990, Namibia has become a tourism destination of rapidly growing regional and international significance. Most tourists visiting the country on holidays look for a special nature- and wildlife–centered experience – through game-viewing, bird-watching, hiking, sport fishing or trophy-hunting. Namibia’s biggest tourism attraction is undoubtedly its sparsely populated, spectacular arid scenery and wide-open spaces. In today’s increasingly crowded world, natural environments are fast disappearing. The solitude, silence and natural beauty found in many parts of Namibia are becoming sought-after commodities that must be regarded as valuable natural assets which give the country a competitive edge in the global market. Therefore, preserving these natural assets by using them sustainably is fundamental to sustaining the development and growth of the tourism sector.

In addition to its unique natural environment and biodiversity, Namibia also has a rich cultural heritage -- with significant archeological sites, well-preserved “pre-historic” rock paintings, rich traditions of handicraft, and a very diverse national population of merely 2 million people made up of a number of ethnically and culturally distinct groups within a country exceeding the size of France and Germany combined. These special cultural and demographic features add value to the country’s tourism product and its future potential as a tourism destination.

In Namibia, tourism is an important employment generator, particularly in rural areas where most tourism activities occur. In addition, tourism contributes to Namibia’s national economy, through provision of a range of diverse services including accommodation, restaurants, transport, entertainment and financial services. Tourism also contributes to wildlife conservation and biodiversity protection, and it results in poverty reduction, particularly in rural areas, through direct and indirect employment and income generation. Land-use for tourism in parts of Namibia, outside protected areas, has high economic potential compared to livestock and agriculture. Through the national community-based natural resources management (CBNRM) program, rural communities in communal areas are empowered to manage their natural resource base sustainably, invest in wildlife and benefit from the resulting tourism opportunities.

The development and growth of the tourism sector since Independence has been impressive, but realizing its full potential and sustaining its contribution to Namibia’s economy far into the future will be a challenge. Not only will it be essential to engage in careful long-term tourism planning and avoid rapid tourism growth that goes at the expense of the ecologically sensitive arid environment, but there will also be an increasing need to identify appropriate
and innovative ways to respond to global climate change and its likely impacts on both Namibia’s tourism resource and the international tourism market.

This part of the review and update of national circumstances covers the tourism sector and specifically the role of tourism in Namibia’s CBNRM programme. The review and update starts with an overview of the tourism sector, the policy, legal and institutional environment for tourism, the contribution of the tourism sector to Namibia’s economy and its role in the national development framework. This is followed by an analysis of origins and recent developments of the country’s CBNRM programme and the role of tourism in this Programme. The review and update then discusses ways in which climate change affects and is affected by tourism, and what this means for Namibia, and concludes with some considerations about tourism- and CBNRM-related data gathering and storing efforts, the degree of data availability and existing data gaps.

The assessment is based on the review of a range of existing literature and consultations with stakeholders and specialists. Key literature consulted includes:

- Tourism Statistics and Tourism Satellite Accounts published by the Namibia Tourism Board
- Documents presenting Namibia’s national development framework (Vision 2030, NDP3, and National Poverty Reduction Strategy and Action Plan)
- NACSO’s “State of Conservancy” reports
- Analyses of the financial and economic performance of conservancy and their contribution to the national economy
- Assessments of the distribution of benefits within conservancies
- The final summary report of the recent Wildlife Integration for Livelihood Diversification (WILD) Project
- Literature on the linkages between tourism and climate change

A full list of references is given at the end of the review. Stakeholders and resource persons met and consulted are listed in an Annex to this review.

4.1.2 Policy, Legal and Institutional Underpinnings of the National Tourism Industry

Significant efforts have been made since Independence to put in place an enabling policy and legal framework conducive to the development and growth of the tourism industry. A White Paper on Tourism was approved by Cabinet in 1994, and the Namibia Tourism Board Act was passed in 2000. Pursuant to the Act, the Namibia Tourism Board (NTB) was formally established in 2001 as a statutory body to regulate and promote Namibia’s tourism industry, with offices in Windhoek, London, Frankfurt, Cape Town and Johannesburg, and funded by a
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tourism levy\(^1\), with additional transfers from the national budget. NTB’s offices were officially opened in 2003 and the levy was introduced in 2004. NTB has taken measures to oversee the tourism industry, on the basis of regulations developed to help implement the Act; promote tourism in Namibia; improve the marketing of the country’s tourism attractions; and serve as a government interlocutor for the domestic tourism industry.

Tourism activity in Namibia has developed over the years on the basis of evolving best practice, subject to various existing government policies. Seeking to formalize de facto tourism policy and practice, the Ministry of Environment and Tourism (MET) recently, in December 2008, published a National Policy on Tourism ((MET, 2008b) in 2008. This Policy aims to provide a framework for the mobilization of tourism resources to realize long-term national development goals and targets set forth in Vision 2030 and the Third National Development Plan (NDP3), respectively (see section 4.1.5 for these goals and targets). The Policy is guided by the following Vision: “A mature, sustainable and responsible tourism industry contributing significantly to the economic development of Namibia and the quality of life of all her people, primarily through job creation and economic growth”. The Policy’s stated principles emphasize, \textit{inter alia}, that: tourism development must be economically, socially and environmentally sustainable, implying the need for adequate protection (sustainable use) of the natural resource base; and tourism investment, development ad promotion must be market-driven, with government support in the areas of infrastructure development, marketing, education and skills development.

A comprehensive national tourism industry survey carried out in 2003 (TIES, 2003), the first such survey in Namibia, provides authoritative information about the structure of the Namibian tourism industry. The Survey breaks the industry down into the following types of tourism establishments: accommodation, restaurants, tour & travel establishments, car hire, cultural and other tourism related businesses. There has been strong growth in accommodation establishments in recent years – before as well as after the tourism industry survey (Sherbourne, 2009). The tourism industry in Namibia organized itself into 10 different private sector tourism associations.\(^2\) These came together in 1992 to form a representative body, the Federation of Namibian Tourism Associations (FENATA), so as to be able to communicate more effectively with Government on tourism issues.

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\(^1\) The tourism levy amounts to 2 percent of the bed and breakfast tariff of accommodation establishments other than campsites and caravan parks (as per Notice No.137 of 2004 in Government Gazette No.3235).

\(^2\) These are: the Hospitality Association of Namibia (HAN); the Namibia Professional Hunters’ Association (NAPHA); the Car Rental Association of Namibia (CARAN); the Tour and Safari Association (TASA); the Namibia Community-Based Tourism Association (NACOBTA); the Tourism Related Namibia Business Association (TRE-NABA); the Namibian Academy for Tourism and Hospitality (NATH); the Association of Namibia Travel Agents (ANTA); the Bed & Breakfast Association of Namibia (B&BAN); the Tour Guides Association of Namibia (TAN). Air Namibia is also a member of FENATA. HAN left FENATA in August 2008.
4.1.3 Tourism Arrival Statistics and Visitors Activity in Namibia

Foreign arrival and tourist statistics are provided in Table 4-1 and Table 4-2 for the years 2006 and 2007. The number of foreign visitors topped the 1 million mark in 2006, increasing by 10% in 2007. This is up from 700,000 foreign arrivals in 1999 and just 300,000 foreign arrivals in 1993 (MET, 2008a) – a trend which highlights the strong growth in foreign travel to Namibia.

Table 4-1: Numbers of foreign arrivals and tourist arrivals (by purpose of visit) in Namibia (MET, 2008a)

<table>
<thead>
<tr>
<th>Purpose of Visit</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of foreign arrivals in Namibia</td>
<td>1,031,677</td>
<td>1,126,759</td>
</tr>
<tr>
<td>Number of foreign tourists visiting Namibia (as % of foreign arrivals)</td>
<td>833,345 (80.8%)</td>
<td>928,912 (82.4%)</td>
</tr>
<tr>
<td>Tourists coming for holidays (and leisure) (as % of number of foreign tourists)</td>
<td>(49%)</td>
<td>(51%)</td>
</tr>
<tr>
<td>Tourists visiting friends and relatives (as % of number of foreign tourists)</td>
<td>(37%)</td>
<td>(38%)</td>
</tr>
<tr>
<td>Tourists on business (as % of number of foreign tourists)</td>
<td>(12%)</td>
<td>(10%)</td>
</tr>
<tr>
<td>Other tourists (as % of number of foreign tourists)</td>
<td>(2%)</td>
<td>(1%)</td>
</tr>
</tbody>
</table>

Some 80% of recent foreign visitors to Namibia have been tourists, based on the World Tourism Organization’s (WTO’s) definition of “tourist”, and about half of these tourists have come to Namibia for purposes of holidays & leisure. However, the proportion of tourist arrivals coming for holidays & leisure varies substantially by country of origin. As a general rule, foreign tourists from overseas come to Namibia predominantly to spend holidays, while most foreign tourists from other African countries come to Namibia for other reasons (visiting friends and relatives or business), with the exception of South African visitors who came as likely for holidays as for other reasons.

From tourism exit surveys, it is also clear that nature/landscape touring and game viewing are the predominant foreign visitor activities, both among tourists generally and among holiday & leisure seekers in particular (Davidson, 2009). This highlights how directly Namibia’s tourism product is linked to the bio-physical environment and the natural resource base and how it may be affected by a changing climate, to the extent that changing atmospheric and weather patterns will impact on the national tourism resource base (more on this in section 4.3).

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3 According to the WTO’s definition of “tourist”, a tourist is “any person visiting a country other than his/her usual country of residence for at least one night, but not exceeding a period of twelve months”.

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Table 4-2: Numbers of foreign tourist arrivals by country/region of origin and proportions of these arrivals coming to Namibia for holidays & leisure, by country/region of origin (MET, 2008a)

<table>
<thead>
<tr>
<th>Country / Region</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># of Tourists</td>
<td>% on holidays</td>
</tr>
<tr>
<td>Africa (total)</td>
<td>628,588</td>
<td>37%</td>
</tr>
<tr>
<td>South Africa</td>
<td>239,886</td>
<td>48%</td>
</tr>
<tr>
<td>Other Africa</td>
<td>388,702</td>
<td>31%</td>
</tr>
<tr>
<td>Overseas (total)</td>
<td>204,757</td>
<td>85%&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
<tr>
<td>Germany</td>
<td>68,214</td>
<td></td>
</tr>
<tr>
<td>U.K.</td>
<td>24,736</td>
<td></td>
</tr>
<tr>
<td>Netherlands</td>
<td>12,196</td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>12,000</td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td>9,406</td>
<td></td>
</tr>
<tr>
<td>Switzerland</td>
<td>8,921</td>
<td></td>
</tr>
<tr>
<td>Other Europe</td>
<td>31,499</td>
<td></td>
</tr>
<tr>
<td>U.S.</td>
<td>16,325</td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>4,645</td>
<td></td>
</tr>
<tr>
<td>Other overseas</td>
<td>16,814</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>833,345</td>
<td>49%</td>
</tr>
</tbody>
</table>

In terms of actual tourism and leisure expenditures, it is primarily the overseas vacationers, and to a lesser extent the South African holiday travelers, that make the greatest contribution to the Namibian economy. This implies that national strategies and actions aimed at maintaining and further enhancing the economic role of the tourism sector in Namibia by consolidating past achievements and sustaining future growth needs to be directed primarily at these target groups. This also means that the prospects of Namibia’s tourism sector will be affected by climate change not only through its impacts on the tourism resource base in Namibia but also to the extent it changes tourism-related attitudes, preferences, demand and willingness-to-pay within and across the above-mentioned target groups (see section 4.3).

4.1.4 The Contribution of the Tourism Sector to the National Economy

The economic value of tourism is particularly hard to measure because tourism involves such an enormous variety of activities. This is an issue not peculiar to Namibia but shared by all countries. As a result of its heterogeneous nature, the tourism sector does not neatly fit into the standard sectoral breakdown of the national economy for purposes of measuring contributions to national income and expenditures, as reflected in Namibia’s National Income and Expenditure Accounts. The percentage of overseas tourists that come to Namibia for holidays & leisure varies between 80% and 95% across countries and regions.

<sup>4</sup> The percentage of overseas tourists that come to Namibia for holidays & leisure varies between 80% and 95% across countries and regions.

<sup>5</sup> Like previous footnote.
Accounts published annually. Rather, different tourism activities are registered under different National Accounts sectors. For instance, the consumptive use of animal wildlife (as meat) and of natural plants (as natural products) is registered under the “Agriculture & Forestry” sector and the provision of hospitality & accommodation, transport and banking services are registered under the “Hotels and Restaurants”, “Transport, Storage and Communication” and “Financial Intermediation” sectors, respectively.

This difficulty in measuring and monitoring the contribution of tourism to the national economy motivated national efforts to attempt to construct separate income and expenditure accounts for the tourism sector (so-called “tourism satellite account”), pulling together data on the full range of tourism-related economic activities, so as to facilitate tourism planning, policy making and economic analysis (Such, 2001). The first complete Tourism Satellite Account for Namibia was published in 2007 (WTTC, 2007), using standard methodology developed and promoted by the UN World Tourism Organisation (WTO) and the World Travel & Tourism Council (WTTC). The first National Tourism Account covers the years up to 2005, with preliminary figures for 2006. A Second Edition of the Tourism Satellite Account (NTB, 2008) provides firm economic tourism data up to 2006, with preliminary figures for 2007, estimates for 2008, and a forecast to 2017.

The Tourism Satellite Account presents consolidated data both on what tourists spend (tourism demand) and on the income earned as a result of establishments offering tourism products and services (tourism supply) as well as on the jobs provided by these tourism establishments, both directly and indirectly.

Based on the Tourism Satellite Account, Table 4-3 provides an overview of the economic value of tourism in Namibia, in terms of total tourism demand as well as direct and overall (direct and indirect) income and employment contributions of the national tourism industry to the national economy. In 2006, the tourism sector’s contribution to GDP was about 4% (directly) and 14% (overall, including indirect effects), and the sector’s contribution to national employment were about 5% (directly) and 19% (overall), respectively. This clearly shows that tourism is already a very important economic activity, contributing to the national economy through a variety of services (accommodation, restaurants, transport, entertainment, and finance) and with a big economic multiplier effect through linkages to other sectors. It also shows that the tourism sector is an employment-intensive economic sector providing an above-average number of jobs per unit national income generated, in particular in rural areas where most tourism activities occur.

The tourism sector experienced strong real growth in 2006, in terms of both total travel & tourism demand (14% growth) and the overall contribution to GDP (15% growth). Strong sector growth is projected to continue, with sector output forecast to quadruple in nominal

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6 The latest published National Accounts are those for the period 2000 - 2007 (CBS, 2008). However, Preliminary National Accounts are already available for the 2000-2008 period (CBS, 2009).
value by 2017, contributing as much as 22% to GDP. But whether such growth can in fact be realized remains to be seen, as this will depend on many factors, not least on how successfully Namibia will be in coping with the impacts of climate change on tourism supply and demand.

Table 4-3: The contribution of the tourism sector to the Namibian economy (NTB, 2008)

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2006</th>
<th>2007P (preliminary)</th>
<th>2008E (estimated)</th>
<th>2017F (forecast)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total travel &amp; tourism demand(^7)</td>
<td>7,883</td>
<td>9,332</td>
<td>10,981</td>
<td>12,752</td>
<td>36,942</td>
</tr>
<tr>
<td>Direct effect of travel &amp; tourism</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP (billion N$) (% of GDP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>1.56</td>
<td>1.83</td>
<td>2.1</td>
<td>2.5</td>
<td>7.8</td>
</tr>
<tr>
<td>Direct effect of travel &amp; tourism</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment (1000 jobs) (% of national total)</td>
<td>20</td>
<td>20.6</td>
<td>22</td>
<td>22</td>
<td>28</td>
</tr>
<tr>
<td>Overall effect of travel &amp; tourism</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP (billion N$) (% of GDP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>5.66</td>
<td>6.65</td>
<td>7.8</td>
<td>9.0</td>
<td>28.4</td>
</tr>
<tr>
<td>Employment (1000 jobs) (% of national total)</td>
<td>73</td>
<td>74.9</td>
<td>77</td>
<td>79</td>
<td>103</td>
</tr>
</tbody>
</table>

The tourism sector not only contributes to national income but also generates tax revenue for the government. Tax revenue includes corporate and personal tax payments as well as VAT, although foreign visitors are allowed to claim back VAT expenses. In addition, there are specific revenues raised by the MET and paid into the State Revenue Fund, most importantly national park fees (some N$ 15 million in 2005/06) and revenue from tourism concession (currently about N$ 2 million, but potentially much more).

4.1.5 The Tourism Sector as Part of the National Development Framework

Wildlife and tourism feature prominently in Namibia’s long-term vision, Vision 2030 published in 2004, which offers the following Sub-Vision for the sub-sector (under the “Natural Resources & Environment” theme): “The integrity of Namibia’s natural habitats and wildlife populations are maintained, whilst significantly supporting national socio-economic development through sustainable, low-impact, consumptive and non-consumptive tourism”. In order achieve “to advance sustainable management of wildlife and tourism for the social

\(^7\) This includes all components of travel & tourism consumption, investment, government spending and exports

\(^8\) This refers to direct plus indirect national income and employment generated.
and economic well-being of the people of Namibia” (Vision 2030 sub-sector objective), the following strategies (along with various actions and targets) are highlighted:

- Improving and accelerating income-generation on conservancies to lessen dependency on Government and other providers of support
- Facilitating opportunities for people to derive economic value from wildlife species that impact on farming and livelihoods
- Updating State-owned park management and tourism development, while placing strong emphasis on high-value, low-impact tourism
- Providing adequate training for persons involved in the tourism industry, to ensure quality services
- Developing and enforcing appropriate environmental and tourism legislation.

The first two bullets specifically relate to Namibia’s national CBNRM programme which is discussed in section 4.2.

The Third National Development Plan 2007/8 – 2011/12 (NDP3, 2007), which was developed as the first medium-term strategic implementing tool towards the systematic achievement of Vision 2030, addresses “wildlife” and “tourism” as sub-sectors 8 and 9 of the Key Result Area (KRA) “Productive Utilisation of Natural Resources and Environmental Sustainability”. This KRA corresponds to and is derived from the Vision 2030 objective of “ensuring the development of Namibia’s natural capital and its sustainable utilization for the benefit of the country’s social, economic and ecological well-being”, which is linked to the Vision 2030 Natural Resources & Environment theme.

Finally, the Poverty Reduction Strategy of Namibia (NPC, 1998) highlights “tourism” as one of three “near-term opportunities for poverty-reducing income generation”, emphasizing that “no other segment of the economy has as much potential to create jobs and generate income for Namibia’s rural communities”. This is reflected in the National Poverty Reduction Action Programme (NPRAP) 2001-2005 (NPC, 2002) – as well as in a subsequent effort to mainstream environment and sustainable development aspects and issues into NPRAP (NPC, 2005) – whose various proposed poverty reduction actions include two actions specifically targeted at wildlife and tourism: Action 25 on the establishment of conservancies and Action 26 on the establishment of community-based tourism projects by and for disadvantaged rural communities.

### 4.2 CBNRM and Tourism

CBNRM in Namibia (as elsewhere in Southern Africa) derives from the central hypothesis that if a resource is valuable and landholders have exclusive rights to use, benefit from and manage the resource, then sustainable use is likely to ensue. The benefits from management must exceed the perceived costs and must be secure over time (Steiner, 1995). The hypothesis rests on three conceptual foundations: one based on “economic incentives” (suggesting an economic rationale for the way in which wildlife is used and managed, with financial as well as ‘intangible’ benefits accruing); another based on the “devolution of management
responsibilities (of the ability to make management decisions)” by the State to local landholders/groups (thus creating conditions for local groups to manage natural resources sustainably); and the third one based on “collective use rights” (secure tenure) held by a defined group of people over land or specific natural resources (to make it worthwhile for them to invest time and effort in resource management in terms of reaping the benefits).

Various kinds of CBNRM-type programs have been developed in Namibia, dealing with different natural resources like wildlife, forests, water and inland fisheries. We will be concerned mainly with one of them here – communal-area conservancies. But we will also briefly address community forests and discuss the broadening of these initiatives into more integrated CBNRM programs that focus on a combination of natural resources and their interrelationships when it comes to making resource management and land use decisions.

4.2.1 Communal-Area Conservancies

4.2.1.1 Origins of Conservancies

The origins of CBNRM in Namibia can be traced to two separate but inter-linked pre-Independence developments involving wildlife – one centered on commercial freehold farms and the other taking place in communal areas. In 1967, the then South West African Administration passed the Nature Conservation Ordinance, which gave commercial farmers ownership rights over certain game species. The intent was to reduce risks of wildlife loss and enhance wildlife conservation on freehold land by giving wildlife a commercial value and providing freehold farmers with an economic incentive to conserve wildlife through sustainable use. Regulations were introduced that allowed farmers to utilize game in a controlled manner. This enabled farmers to hunt, sell, capture and relocate wildlife according to their own economic interests. This legislative change led to a massive increase in the numbers of wildlife on freehold farms – for instance, with 80% more combined wildlife counted on freehold farms in 1992 than two decades earlier (Barnes, 1996).

The other development was the continuing decline in wildlife numbers during the 1970s and early 1980s in most communal areas, in sharp contrast to what was happening on private land. The decline in wildlife resources was particularly dramatic in the north-western pre-Independence homelands – Kaokoland and Damaraland – now the Kunene Region, with numbers of desert-dwelling elephant and black rhino plummeting during the late 1970s and early 1980s due to poaching. A number of factors contributed to the pre-Independence decline in wildlife populations in communal areas, including: the Apartheid policy of relocating African populations to communal areas; the resulting massive increases in human and livestock numbers in these areas; the accompanying loss of wildlife habitat; the lack of appropriate legislation promoting local-level resource management and utilization; heavy poaching; periods of drought; and (particularly in the north-west and north-east) the presence of the SADF, armed conflict, and associated influx of firearms.

This rapidly deteriorating situation motivated some committed government conservationists in the early 1980s to start working with traditional leaders in the north-west, under difficult
circumstances, in an effort to contain poaching “from within”. This led to the appointment of Community Game Guards (CGGs) to monitor wildlife and any suspicious activities, and then report to their headmen who would decide on a course of action. An NGO – the Namibia Wildlife Trust (NWT) -- was created in support of this work. This early collaborative effort between NWT, local leaders, and particular individuals in the Nature Conservation Directorate, together with locally recruited CGGs, in the north-west was soon followed by a similar effort and approach in the north-east – a process that eventually led to the foundation of CBNRM in Namibia.

The process toward greater community involvement in wildlife management on communal land that had began before Independence, led to tangible CBNRM policy and legislative development after Independence. There were different strands in this process that combined to produce the policy and legislative outcome. These include: rural residents’ concerns over better wildlife management, the work of conservation NGOs like NWT, experience elsewhere in the region (e.g. CAMPFIRE in Zimbabwe), lessons from the freehold farming sector (where some farmers had combined their resources to manage wildlife collectively, within so-called “freehold conservancies”), and new ideas and design principles about common property resource management institutions. In 1995, MET announced their new *Wildlife Management, Utilisation, and Tourism in Communal Areas Policy*, which states that:

- The right to utilize and benefit from wildlife on communal land should be devolved to a rural community that forms a conservancy as defined in the Policy;
- Each conservancy should have the right to utilize wildlife within the bounds of the conservancy to the benefit of the community. Subject to quotas for each available species, it is up to conservancy members to decide how these animals are to be utilized – for hunting by members, culling for meat, sale for trophy hunting and/or sale of live game;
- The conservancy should be able to enter into business arrangements with private companies to carry out some or all of these activities;
- The conservancy also has the right to establish tourism facilities within its boundaries or engage in a commercial arrangement with a registered tourism operator to act on its behalf.

These policy provisions were put into effect through the *Nature Conservation Amendment Act* of 1996, which amends the Nature Conservation Ordinance of 1975 so that the residents of communal areas can gain the same rights over wildlife and tourism as were previously granted to the freehold farmers. According to this Amendment Act, any group of persons residing on communal land may apply to the Minister (MET) to have the area they inhabit (or part of it) declared a conservancy, and the Minister will formally declare (gazette) a conservancy provided the applicant has: defined its members; defined the boundaries of the conservancy; formed a representative committee; developed a plan for the distribution of benefits among members; and agreed upon a constitution.

The rights of conservancies to utilize wildlife are conditional (they depend on a conservancy institution meeting specified criteria having been established) and limited (they extend only to a limited number of defined species, as per set quota, for own use). In addition, the
conservancy rights are legally vested in the conservancy committees and not broadly in the communities within conservancies. Nevertheless, there are a number of actual wildlife management rights that the legislation gives to local communities through their conservancy committees, and there are other resource management activities not provided for in the legislation that conservancies can undertake – such as land-use planning and zoning of conservancy land for wildlife and tourism, and developing tourism plans and regulations – albeit without a clear existing legal grounds for enforcement.

The institutional arrangement provided for in the conservancy legislation was meant to create local-level institutions capable of managing wildlife as a common property resource and having the legal persona to enter into contracts and to ensure transparent and accountable decision-making within the conservancy. Nevertheless, there is evidence that the issue of who belongs and who is entitled to benefit – registered members; or members of communities falling under the local traditional authority, or some combination of the two – is subject to different interpretations that vary from conservancy to conservancy. This suggests a flexible, responsive approach to implementing policy, leaving greater space for communities and conservancies to decide on criteria for inclusion and exclusion.

4.2.1.2 Evolution and Current Status of Conservancy Programme

Subsequent to the promulgation of wildlife-focused CBNRM policy and legislation in 1995 and 1996, numerous expressions of interest and applications to form conservancies were received from local communal area groups in different parts of the country, in particular the north-west and north-east. It did not take long before the first four conservancies – Torra and ≠Khoadi-//=Hôas, Salambala, and Nyae Nyae located in the Kunene, Caprivi, and Otjozondjupa Regions, respectively – were formally established in early to mid 1998. In subsequent years, additional conservancies came into being in increasing numbers, and by the end of 2007, within a period of less than 10 years, a total of 50 conservancies had been established in nine out of 13 Regions, managing nearly 120,000 km$^2$ of communal land, with about 220,000 residents. (Since then, the number of conservancies has climbed further to 55, as of today.) A further 25 communities were forming conservancies by the end of 2007 (20 conservancies as of today). Income to registered conservancies plus from other CBNRM activities outside conservancies rose from N$ 600,000 in 1998 to nearly N$ 40 million in 2007. Direct and indirect contributions of CBNRM to the national economy for the same year amounted to approximately N$ 220 million.

The rapid growth in conservancies, in terms of communal area covered, people affected, and income generated by conservancies, is shown in figures 4-1 and 4-2.
Figure 4-1: Area covered by and people living in conservancies (Source: (NACSO, 2008))

The geographic distribution of conservancies, alongside other conservation areas (national parks and game reserves as well as freehold conservancies), is given in Figure 4-3. At the end of 2007, conservancies covered 14.4% of Namibia, more than one third of the total land surface area currently under active conservation management (38% of the country).

A complete list of registered conservancies is provided in Table 4-4. It is clear that conservancies vary greatly in size, number (and density) of people (residents), number of registered members, type of landscape, climate, livelihood systems, abundance of wildlife, tourism potential, and other features.

Developing from small pilot community-based conservation activities pioneered in the Kunene and Caprivi Regions, the CBNRM programme now is a major component of the MET’s 5-year Strategic Plan 2007-2012, implemented through partnerships between MET, regional councils, NGOs, the private sector and rural communities. Technical and institutional support is being provided to conservancies through the Namibian Association of CBNRM Support Organisations (NACSO). This is a grouping of 13 local NGOs, the University of Namibia, and individual associate members including two communal-area conservancy associations (Otjozondjupa and Kunene).

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9 The other components of Namibia’s resource conservation regime are national parks and game reserves (16.5% of national land area, inclusive of the just-proclaimed Sperrgebiet National Park), freehold conservancies (6.1% of land area) and tourism concession and community forests (1.3% of land area).
10 For instance, Nyae Nyae and N/a-Jaqua in Otjozondjupa Region each cover some 9,000 square km, an area 100 times bigger than Oskop in Hardap Region (95 square km).
11 Not all people living within the boundaries of conservancies have signed up as conservancy members. In fact, the proportion of residents within conservancies that are registered conservancy members varies widely and is quite small in some cases.
Figure 4-2: Income to conservancies and from CBNRM activities (NACSO, 2008)

![Bar chart showing income to conservancies and from CBNRM activities from 1994 to 2007.](image)

Figure 4-3: Distribution of conservancies across Namibia (NACSO, 2008)

![Map showing the distribution of conservancies across Namibia.](image)
The nature and scope of the CBNRM programme has also evolved and changed. Initially the main focus was on wildlife, craft development and the harvesting and sale of thatching grass. Meanwhile increasing attention is being given to other natural resources and how to use and manage them sustainably. Some conservancies like Nyae Nyae develop and market of indigenous plant products (notably Devil’s Claw). Other conservancies, notably in the Caprivi Region, are developing holistic approaches to sustainable rangeland management, in an attempt to improve degraded grazing resources and associated livelihoods, and/or engage in conservation agriculture. Yet others combine wildlife and forest management, with increasing cooperation and integration taking place between conservancies and community forests. The boundaries of six of the 13 existing community forests overlap with those of registered conservancies, and several community forests intend to apply for conservancy status.

Table 4-4: Conservancies registered by the end of 2007 (NACSO, 2008)
The CBNRM programme has evolved through several phases. Initial efforts focused on the establishment of the first conservancies (Phase 1). This was followed up with focused support to build institutional capacity and develop wildlife-based enterprises, though the provision of operational grants and technical assistance, until the set of early conservancies were able to generate income (Phase 2). Subsequently, with the emergence of a number of additional conservancies, the CBNRM expanded considerably, with a concomitant shift in programme emphasis on developing and scaling up the support and monitoring systems and procedures necessary to sustain the fast growing programme on the one hand and promoting good governance and ensuring accountability of committees to members on the other (Phase 3). During that phase, several of the first conservancies achieved financial independence, being able to cover their own operational costs. Currently (phase 4), the programme focuses broadly on enhancing programme sustainability at different levels and moving toward greater diversification and integration in the natural resources being managed sustainably and in the enterprises being developed for income and employment generation (NACSO, 2008).

### 4.2.1.3 Income Generated by Conservancies from Wildlife and Tourism Enterprises and Other Sources

One of the central aims of the CBNRM programme is to improve the livelihoods of rural people through the sustainable use of natural resources. Conservancies collectively earned a total of about N$ 40 million in 2007 and this income has grew substantially from 1999 – see figure 4-2). Most of the growth in overall conservancy income has come from tourism and wildlife utilization, as the number of tourists and the interest of tour operators, investors and hunters have grown substantially over the years. The Kunene and Erongo Regions have attracted the majority of tourists, but significant growth has also been experienced in the Caprivi, Kavango and North-Central Regions.

**Figure 4-4: Principal sources of income for conservancies in 2007 (NACSO, 2008)**

![Figure 4-4: Principal sources of income for conservancies in 2007 (NACSO, 2008)](image)

Figure 4-4 provides a breakdown of the sources from which conservancy income has been generated for 2007 (NACSO, 2008). The largest contribution (N$ 14 million) came from joint venture tourism, followed by direct wildlife utilization (N$ 12 million) which includes
N$ 7 million from trophy hunting and N$ 2 million from meat distributed by trophy hunters. As for cash income available to conservancy committees to cover operational costs, the largest sources were trophy hunting (N$ 6.4 million) and joint venture lodges (N$ 4.3 million). Most of the cash income earned by individual conservancy members was in the form of wages.

Here, joint venture lodges are the dominant source (N$ 7 million), followed by trophy hunting and the marketing of veld products (mainly Devil’s Claw as distant second and third. Non-cash or ‘in kind’ income to conservancies include meat from trophy hunting or own use hunting (largest non-cash income source), as well as donations (such as computers, equipment, and bursaries made available by joint venture partners).

Figure 4-5 depicts changes in revenue over time as well as income sources and proportions of revenue for a selection of 14 conservancies. There are substantial variations between conservancies in both the way income was generated and how overall incomes levels have increased (and sometimes decreased) from year to year (NACSO, 2008). While the number of conservancies generating some level of income has further increased (from 38 conservancies in 2006 to 41 in 2007, conservancies with the most attractive (wildlife and scenic) resources for tourists and trophy hunting tend to generate the highest incomes.

By the end of 2007, 19 formal joint venture lodge agreements had been concluded and were generating benefits – and increase of 90% from 2005. Several other joint venture agreements are being negotiated, and payments are received from private sector partners with which agreements had not yet been finalized. Conservancies earn joint venture income by negotiating a levy or income-sharing agreement, or by becoming a shareholder in the fixed assets or the actual businesses themselves, thus gaining community equity. Joint venture partnerships provide a mechanism for conservancies to contribute tourism rights and commitments to actively manage natural resources and acquire skills and experience in the tourism industry, while private sector partners bring in capital, expertise in tourism, and access to markets. There is significant potential and scope for further joint venture partnerships to emerge and for income from joint venture tourism, the largest source of conservancy income, to grow further.

A total of 29 hunting concessions provided incomes to 32 conservancies during 2007. Aside from trophy hunting and the distribution of meat from hunted trophy animals and game harvested for conservancies own use, direct wildlife utilization, the second largest source of benefits, also includes: game meat sold to butcheries, wages and benefits earned working for trophy hunters, premium (non-trophy) hunting, and sale of live game.

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12 Community equity joint venture lodges are operating in the ≠Khoadi-//Hôas Conservancy (Grootberg Lodge) and the in Doro ‘Nawas Conservancy (Nawas Lodge)
Figure 4-5: Income sources, proportions of revenue type, and changes in income over time (NACSO, 2008)
However, incomes from tourism and wildlife vary substantially across conservancies, in terms of both total value and type of income, although the number of conservancies generating some level of income has further increased (from 38 conservancies in 2006 to 41 in 2007. Generally, conservancies with the most attractive (wildlife and scenic) resources for tourists and trophy hunting tend to generate the highest incomes.

4.2.1.4 Financial and Economic Performance of the Conservancies -- and Distribution of Benefits within Conservancies

An appraisal of the financial profitability and economic efficiency of selected conservancies (based on conservancy development plans and projected incomes, rather than an ex-post evaluation of actual performance) showed that conservancies generate attractive financial returns for rural communities (from wildlife use as well as from donor grants reflecting international non-use values) and that they are economically efficient (Barnes, 2001), (Barnes, 2002) and (Barnes, 2008)). It was found that all of the five conservancies assessed generate favourable rates of return on their investments (some more favourable than others, but all above 8% annually) and all of the conservancies are economic, contributing positively to national development. Viewed from the perspective of a project investor (donors, government and community, taken together) – a perspective providing an indication of the broader financial viability of a conservancy initiative -- project returns are found to be moderate but generally positive and acceptable. The assessment concludes that conservancies in Namibia appear able to deliver positive financial incentives to communities, contribute positively to national development, conserve wildlife, and be at least as sustainable as other rural development initiatives.

The analysis also concluded that to donor contributions do not necessarily make conservancy initiatives less sustainable, but perform an important catalytic role in initiating and speeding up land use change. Donor contributions were found only to reduce, but not to eliminate community financial incentives, with ‘intangible’ benefits (like empowerment, training, and improved livelihoods) also providing incentives. Further, donor grants establish the base for a change in land use, as they are concentrated in the initial capital and focused on building wildlife stocks, institutions and skills. Later on, these sunk costs tend to have higher returns, without necessarily requiring more donor money.

Positive financial returns on investment at conservancy level, however, do not necessarily translate into positive returns at household level within these conservancies, and this requires research. The distribution of benefits and income within conservancies has been investigated using econometric models and drawing on data of two recent household-level surveys across

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13 The conservancies assessed were: Torra and =/Khoarai/Hôas in the northwest; Nyae Nyae in the northern Kalahari; and Mayuni and Salambala in the northeast.
14 Ex-post analysis will be necessary to confirm whether this is truly so or not.
a selection of conservancies. On the basis of the results of a socio-economic household survey conducted in 2002 by the WILD Project (SEHS, 2002) across seven conservancies and 1,192 households in the Kunene and Caprivi Regions. The first study examined the extent to which conservancies have been successful in meeting their primary goal of improving the lives of rural households. Conclusions were: that community conservancies do have a positive impact on household welfare; that this impact appears to be poverty neutral in some regions (Kunene) and pro-poor in others (e.g. Caprivi), suggesting the relative absence of elite capture of conservancy benefits; and that welfare benefits from conservancies may be more evenly distributed between conservancy participant and non-participant than might be expected.

A subsequent quantitative study of the distribution of benefits within conservancies used the results of a socio-economic household survey carried out in 2006 (SIAPAC, 2006), also in the Kunene and Caprivi Regions. This survey, unlike the previous one, included control areas in each of the two Regions. The study found that for Kunene: average consumption in a conservancy household significantly exceeds that in a control area household, but with household characteristics like education, wealth and CBO membership explaining much of the differences in welfare; in the absence of CBOs and other factors, the conservancy itself has no ‘pure’ effect on households living in conservancies. The results are similar for Caprivi Region where conservancies make a difference only where there are CBOs as well. Participation in conservancy activities (which may or may not be associated with wealth or assets, depending on the Region) is generally found to have large and measurable conservancy household welfare benefits.

The results of these studies into the distribution of benefits highlight the importance for conservancy household consumption (welfare) of both participation in conservancy activities and synergy between conservancy and CBO institutions (where they exist). Further distributional welfare studies are needed to trace household benefits resulting from the establishment of conservancies over time.

Sustainable natural resource management by rural people and communities may be seen as an ecosystem service (ES) that these people and communities provide to others (the state and the private sector) who have a vested interest in seeing the land and natural resources conserved and sustainably managed for sustainable benefits to be derived. It can be argued that rural people deserve being remunerated for such ecosystem services and that rural community income generated from wildlife-based tourism, in partnership with the private sector, government and NGOs, is one possible form of the required payments for ecosystem services (PES) (Libanda, 2008).

4.2.1.5 Impact on the National Economy

The value of benefits from conservancies to local communities (conservancies and member households) amounted to a substantial N$ 40 million in 2007 (see figure 4-2). However, the impact of the CBNRM programme on the broader economy is much bigger than that, on various counts. Various forward and backward linkages from programme activities to other
economic activities in the broader economy – such as demand for goods and services from tourism enterprises, spending of tourists on goods and services in the wider tourism sector, re-spending of income earned by conservancy member households -- and associated multiplier effects turn micro-level programme benefits into much more larger macro-level benefits, at the level of the overall economy. Taking into account these linkages and multipliers, the CBNRM contributed approximately N$ 220 million in national income (net of capital depreciation) to the economy in 2007, an increase of roughly 30% over net national income in 2006, after a similar increase the year before (NACSO, 2008).

Figure 4-6: Economic benefits from CBNRM programme, 1990 – 2007

Figure 4-6 depicts the rising annual contribution of the CBNRM programme to net national income, plus increasing wildlife stock asset values, against total CBNRM programme spending. The macro-economic merits of the CBNRM programme become clear when the cumulative benefits in terms of net national income (N$ 945 million from 1990 to 2007) are compared with the cumulative programme investments by external donors (in cash) and government and NGOs (mostly in kind) over the same period (N$ 802 million). Earlier programme investments are now being paid back by the programme. For the period from 1990 to 2007 and with flows of benefits and investments as depicted in Figure 4-6, the CBNRM programme had an economic internal rate of return of 13% and generated a net present value of N$ 95 million. These values indicate that the CBNRM programme is economically fully viable.

4.2.1.6 Uses of Income Generated by Conservancies

Sub-section 4.2.1.3 provided an overview of sources and types of income generated by conservancies over time. This sub-section discusses the purposes for which this income has been used.

In 2007, conservancies collectively disbursed a total of N$ 22.5 million in income (excluding contributions by donors and support agencies), spending approximately N$ 8.2 million (or 37%) of this total on conservancy management to cover conservancy running costs, make
capital investments, and pay conservancy staff. Of the 27 conservancies contributing to their own operational costs in 2007 (ranging between N$ 90,000 and 450,000 that year), 15 conservancies covered all their running costs, making them financially independent from donor or other external support, up from 4 only four conservancies in 2003. The 27 conservancies that paid for part or all of their operations employed 154 full-time and 50 part-time staff positions, while donors support covered the salaries of another 141 full-time staff. The value of conservancy-funded jobs increased seven-fold from 2003 (N$ 480,000) to 2007 (N$ 3.36 million).

Some conservancies funded the investment and maintenance of infrastructure. Such capital and maintenance expenditures were targeted at a variety of different items, including the upkeep of campsites, the construction and maintenance of office buildings, computer equipment and furniture for offices, vehicles for managers and members, horses for wildlife patrols, bicycles for staff, field equipment for game guards, installation of water points for villagers and wildlife and maintenance of water dams to supply water to elephants. An increasing number of conservancies drew up work and expenditure plans and budgets and got their budgets approved by their AGMs. As well, new administrative and managerial staff positions were created in different conservancies for the effective management of their finances.

Beyond conservancy wage and operational costs, all other conservancy funds went to members in one form or another – salaries for private jobs, cash payments, household meat, and social benefits. This benefit stream to members amounted to a total of N$ 14.3 million and represented 73% of all payments in 2007. The greatest proportion of these benefits (39%) went to support private sector jobs, followed by the provision of meat to members from trophy hunting and own use hunting (17%; up from 4% in 2003), social benefits and cash payments.

**Figure 4-7: Recent growth in conservancy disbursements, by type of spending, for 2007 (NACSO, 2008)**

![Diagram showing recent growth in conservancy disbursements](image)

Regarding private sector jobs, there were 534 full-time and 1,432 part-time people employed by tourism and wildlife enterprises (joint ventures, conservancy campsites, and trophy hunters). Most of the part-time jobs resulted from the commercialisation of high-value plants,
most importantly Devil’s Claw and Commiphora wildii. Members in the many conservancies with little or no cash income were at least able to benefit from game meat.

Cash payments rose steeply in 2007, more than doubling compared to 2005. 16 conservancies distributed a total nearly N$ 1 million to their members, while in 2005 only five conservancies had made cash payments. Finally, payments for social welfare and development projects included: contributions to local traditional authorities, educational bursaries, soft loans to members for school fees, annual Christmas gifts to pensioners, soup kitchens, support to local schools, HIV/AIDS related activities, compensation of members for costs incurred from elephant damage, contributions to local Human Wildlife Conflict Conservancy Self-Insurance Scheme (HACCSIS), donations to local farmers associations, transport for members, and contributions to special reserve funds to benefit members.

Figure 4-7 shows recent growth in collective conservancy disbursements, broken down by type of disbursement, for the conservancies that earned and disbursed some income (27 out of 50 conservancies in 2007). All forms of conservancy spending grew substantially between 2003 and 2007, although some types (capital development and cash payments) declined (temporarily) in 2005.

Figure 4-8 provides an overview of income allocations for a select number of financially sustainable conservancies (covering their own operational costs). There are substantial variations between conservancies, both in the level and in the diversification of disbursements.
Figure 4-8: Allocation of conservancy income for selected conservancies, for 2007  
(Source: NACSO, 2008)
4.2.1.7 Livelihood Impacts

To date, the national CBNRM programme generally and the conservancies in particular, have consistently pursued the dual objectives of natural resource management and rural development, contributing directly to social empowerment and institutional capacity building in the process. Keys areas of support have been what are known as the three pillars: natural resource management; enterprise development (to generate benefits from wildlife and tourism); and institutional development. Questions have arisen, however, regarding the extent to which CBNRM is able to directly support the livelihoods of rural communities and in so doing contribute to the national development targets of poverty reduction and rural economic growth.

This motivated a first systematic and comprehensive attempt to examine the impacts of conservancies on the livelihoods of their members and people living within conservancy boundaries more generally, through in-depth field research focusing on selected conservancies (four each) in the Caprivi and Kunene Regions that was carried out in the period 2002-2003, under the Wildlife Integration for Livelihood Diversification (WILD) Project. This mostly qualitative research led to recommendations in the final WILD Report that the three existing pillars of support be complemented by a fourth pillar, dedicated to enhancing livelihood security and generating diversification opportunities by building on existing livelihood strategies and activities (Long, 2004).

The WILD Project found evidence that for the majority of rural people the contribution that wildlife and tourism makes through the conservancy is not seen to be of central importance, even in wildlife-rich conservancies. On the other hand, it was concluded, current benefit streams from wildlife and tourism are already providing some level of support for existing livelihood activities and strategies. Employment through tourism enterprises or conservancies, for instance, was found to provide wage incomes comparable in level with average regional household incomes in the Kunene and Caprivi Regions. Earning such incomes is very positive for those households whose members gain employment, improving their livelihood securities considerably. However, very few economically active people in wildlife-rich Regions like Kunene and Caprivi (and even less people other Regions with less wildlife) have access to such gainful employment, and those who happen to enjoy such employment tend to be the wealthier and more educated people, with more livestock and/or larger crop areas. This, it was concluded, suggests the need for more pro-poor tourism development having direct positive impacts for poor people and contributing to poverty reduction, enhanced security and social empowerment.

By contrast, production and sale of craft, it was found, generates incomes of direct benefit to the producers, often women from poorer households. Thus the effects on individual livelihoods, poverty reduction and gender equity can be high, even though overall benefits at conservancy level may be low compared to wildlife-based tourism. This provides an opportunity for conservancies to use some of the benefits from tourism to help crafts people
access markets and experiment with a wider range of natural resources for crafts production. As far as the distribution of household cash dividends is concerned, the conclusion was that this can help meet one-off expenses like school fees but will normally not be able to cover recurrent household expenditures for food and other consumption items, as pensions can. Even though cash handouts will be welcome when they arrive, it is regular access to cash that contributes to consumption and food security.

Distribution of meat from community hunts is limited to those conservancies where the available wildlife is plentiful relative to the number of beneficiaries. This benefit stream was found to provide limited livelihood security due to its one-off nature. Nevertheless, the direct link between managing and benefiting from wildlife was found to be important in reminding members of the actual gains from natural resource management. Addressing livelihood threats from living with wildlife, it was concluded, is a complex but critical problem. On average, financial loss from wildlife damage is small compared to average annual incomes, but those who are affected may lose a lot, and it is the poorer groups that tend to suffer most. The conclusion was that a combination of (participatory) measures like improved monitoring, problem animal control, protecting water points, electric fencing and compensation through HACCSSIS will be needed and if effective, will have important social equity effects.

People in conservancies continue to focus on those livelihood strategies which they know from experience provide the best means to meet their need. These are based on livestock (Kunene) and cropping (Caprivi), along with natural resource use (including wildlife and veld products), reliance on pensions and remittances, and access to informal employment. The WILD Project recommended that for CBNRM to better address livelihood security and diversification requires creating direct links between the activities and practices of rural producers and income from wildlife and tourism – which, in turn, requires a thorough understanding of livelihoods in conservancies. A number of options were found to be available to conservancies to provide critical direct support to existing livelihoods. For instance, in Caprivi effective provision of animal draught power would go a long way to removing the main crop production constraint for those who produce the least. Or, in Kunene provision of animal health care, and support to improved livestock production and market access would have a strong effect livelihood security, but this may rather benefit the wealthier livestock owners for which reason the support would have to be designed to address equity issues if it is to aid the poorer segments.

Since the WILD Project was carried out (2002-2003), conservancy incomes have risen substantially, particularly in wildlife-rich conservancies established early during the conservancy programme. There are a number of more recent studies and conservancy programme assessments that have examined livelihood issues and aspects. The results of two more recent econometric based ((Bandyopadhyay, 2004) and (Bandyopadhyay, 2008)) on socio-economic household surveys carried out during 2002 and 2006, respectively, in selected conservancies in the north east (Caprivi Region) and the north west of Namibia have already been summarized in sub-section 4.2.1.4 These studies provide an important quantitative cross-sectional picture of the distribution of household-level welfare improvements resulting from conservancy income disbursements, but do not capture all of
the livelihood benefits provided by conservancies. Some of the more intangible livelihood benefits can only be assessed using qualitative research methods.

Table 4-5 summarises information on benefits provided by four conservancies in the Kunene Region (Anabeb, Marienfluss, Puros, and Sesfontein) from conservancy income generated - drawn from a recent mid-term evaluation of IRDNC’s CBNRM programme in the Kunene and Caprivi Regions (Jones, 2007). Apart from jobs, cash payouts and meat distribution from community hunts, these conservancies provide a number of more intangible benefits in terms of social projects. These include: using the conservancy vehicle to transport needy people to the clinic; transporting children to and from school; a social fund to help people in emergencies; financial support for school (fees); and provision of social infrastructure (schools and clinics).

In Puros, for instance, the nearest school used to be at Sesfontein, about 100 km away on a rough bush track. Children had to be sent to the school at Sesfontein and parents had to pay for them to stay in the school hostel. Now the conservancy has facilitated the construction of a school by one of its joint venture partners, and provides food and a cook for the school. This enables local children to stay in the village and parents do not have to pay the hostel fees. Marienfluss Conservancy has also assisted in the provision of facilities for a mobile school and a mobile clinic and is negotiating with joint venture partners to bring flying doctors to the area. It provides transport or cash to pay for transport to get sick people to hospital. The nearest schools and clinics are more than 200 km away. Clearly these kinds of benefits have an immediate effect on the livelihoods of the children (or adults) affected, although in-depth assessments of the livelihood strategies of the affected households and of the extent to which they have access to livelihood assets would be required to determine the precise livelihood impacts and the degree to which these services are pro-poor (benefit the poorer among the rural poor).

A meta-synthesis has recently been prepared of published and unpublished research conducted on livelihoods and CBNRM activities in IRDNC areas (Kunene and Caprivi Regions), since the inception of the IRDNC programme in the early 1990s (Suich, 2009). The meta-synthesis used as primary sources 25 papers, selected from among a total of over 200 papers dealing with livelihood aspects in conservancies. All of the selected papers report results form (qualitative and to a much lesser degree quantitative) field research on livelihood aspects in different conservancies in these two Regions, using a variety of methods and tools for data collection and analysis. The analysis and meta-synthesis of reported livelihood impacts was based on the sustainable livelihoods framework, with impacts considered on the basis of their effect on conservancy residents’ access to and returns from livelihood assets (financial, human, natural, physical and social).
Table 4-5: Benefits provided to members in four conservancies in Kunene Region (Jones, 2007)

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Anabeb</th>
<th>Marienfluss</th>
<th>Puros</th>
<th>Sesfontein</th>
</tr>
</thead>
<tbody>
<tr>
<td>Borehole for domestic water use</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>Planned</td>
</tr>
<tr>
<td>Lifts to clinics and in other emergencies with conservancy vehicle</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment in tourism lodges/activities linked to the conservancy such as joint ventures</td>
<td>8</td>
<td>14 (2 part-time)</td>
<td>35 (2 part-time)</td>
<td></td>
</tr>
<tr>
<td>Conservancy employment (including conservancy owned campsites)</td>
<td>11</td>
<td>13</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Employment in hunting</td>
<td>4 part-time</td>
<td></td>
<td>5 part-time</td>
<td></td>
</tr>
<tr>
<td>Support to local school (food and/or cash)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Own use hunting quota divided among local institutions</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transport children to and from schools in Sesfontein and Opuwo</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Donation of game meat for meetings and festivals</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Meat from own use and other hunting to Households</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Income from craft sales to individuals</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loans to individuals</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social fund to help people in emergencies</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial support for school children/prizes, bursaries for tertiary education</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Financial support to provide teachers</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acquisition of conservancy property to house members on visits to town</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contribution to human/wildlife conflict self-insurance scheme payments to members to offset livestock losses</td>
<td>✔</td>
<td></td>
<td></td>
<td>Planned</td>
</tr>
<tr>
<td>Provision of infrastructure (e.g. room for mobile clinic, classroom, etc.)</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Payments/cash support to Traditional Authority</td>
<td>✔</td>
<td></td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Support to local sports teams/tournaments</td>
<td>✔</td>
<td></td>
<td></td>
<td>✔</td>
</tr>
</tbody>
</table>

Table 4-6 summarises the results, in terms of major categories of impacts resulting from the activities associated with the CBNRM programme in the Kunene and Caprivi Regions. The table is not to be read as suggesting that all of the listed impacts affect each individual and/or household in a given conservancy, nor that they occur in each and every conservancy within the Regions.

The analysis of the livelihood literature focusing on conservancies in the Kunene and Caprivi Regions demonstrates uneven or selective consideration of impacts arising from CBNRM and related activities, without justification of the insignificance of impacts from activities covered less extensively. As well, research to date has focused heavily on a few of the longest-running and higher revenue-generating conservancies, in particular Mayuni and Salambala in Caprivi and Torra in the North west. A number of positive impacts on livelihoods are found...
to be arising from CBNRM and related activities, including full-time employment, part-time remunerated work, cash payouts, and natural resource harvesting (including crafts production), though the extent of these impacts, and the degree to which they affect individuals largely remain to be determined. Distribution of meat (from trophy and community hunting) increase food availability, as does (or is beginning to do) conservation farming in Caprivi. The distribution of grocery packages to elderly and disabled people during the festive season in Torra Conservancy increased food availability among this more vulnerable population segment.

Table 4-6: Impacts on access to and returns from various livelihood assets and their causes

<table>
<thead>
<tr>
<th>Impacts on financial assets:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased income (and income security) – from full-time, part-time or casual employment from natural resource harvesting and/or production activities, from distribution of conservancy income (e.g. Human-Animal Conflict Conservancy Self-Insurance Scheme (HACCSS)/or benefit distributions).</td>
</tr>
<tr>
<td>Reduced income – from HWC, reducing surplus agricultural production.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Impacts on human assets:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase in skills and experience – from employment.</td>
</tr>
<tr>
<td>Increased promotion and/or employment opportunities – from employment and training.</td>
</tr>
<tr>
<td>Increased access to (legal) game meat – meat distributions from trophy and community hunting.</td>
</tr>
<tr>
<td>Increased food availability – game meat distributions and conservancy benefit distribution (the latter is relevant to Torra only).</td>
</tr>
<tr>
<td>Reduced household food availability – HWC (Caprivi).</td>
</tr>
<tr>
<td>Improved access to (illegal) game meat – improved wildlife monitoring and reduced poaching.</td>
</tr>
<tr>
<td>Improved harvests (and thus food security) from conservation farming training efforts in improved farming methods (Salambala).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Impacts on natural assets:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved integration of natural resource management – grazing management in Kunene, and fire management in Caprivi.</td>
</tr>
<tr>
<td>Reduced access to land and/or resources resulting from zoning land for wildlife and/or tourism.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Impact on physical assets:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved access to, or returns from, physical assets – from the investment of community/conservancy income.</td>
</tr>
<tr>
<td>Reduced access to, or returns from, physical infrastructure – from HWC damage (Kunene).</td>
</tr>
</tbody>
</table>

| (continued on next page ...) |

Activities to regulate and commercialise the harvest of Commiphora in the North west appears to have increased locally exercised control over these resources. There has also been some increase in access to physical assets and infrastructure. The impacts of these increases are highly specific to the nature of the investment undertaken, but provide typically positive impacts for those who have access to them. Increased social capital and cohesion result from participation in decision-making, the ability to meet needs locally and support to and from other local institutions. Attitudes towards wildlife are also found to be broadly positive, reinforced by benefits received and the expectation of future benefits. Pride in some traditional skills, such as basked production, has also increased.

The primary negative impacts from CBNRM and related activities are found to be associated with:

- Human-wildlife conflict (HWC) – reducing financial security of some farmers and food availability among affected households (Caprivi) and having similar effects from loss of livestock in Kunene;
• Increased effectiveness of wildlife monitoring – reducing access of some households to illegal game meat through poaching and hence food availability for these households;
• Land use zoning – resulting in the loss of access to some sites for grazing, cropping and/or collecting wild foods;
• Incomplete control over land and resources – resulting in the inability to keep outsiders out, thus increasing competition for resources within the conservancy;
• The Exclusion of certain groups from participating fully in decision-making – reducing social capital; and
• Occasional conflict – arising from (or being exacerbated by) conservancy formation, domineering and/or marginalizing management styles, and disputes over the fairness of benefit distribution.

The overall impact on households within conservancies was found to differ primarily according to the type of the impacts felt, but also according to the duration, frequency and timing of the impacts, as well as the circumstances and preferences of households and their access to particular activities and consequent impacts (Suich, 2009).

4.2.1.8 Sustainable Use and Management of Wildlife and Other Resources

Generating sustainable benefits from wildlife and tourism for rural development in communal areas presupposes the sustainable management of the wildlife resource and related resources in these areas, for which the devolution of management rights and responsibilities to people living in these areas has provided a necessary basis. The CBNRM programme originally was conceived to address the twin problems of dwindling wildlife populations and dispossession of rural communities of the wildlife resource (see section 4.2.1.1). While the expansion of conservancies, community forests and other natural resource management areas is a broad indicator of conservation success in itself, what effects have the devolution of resource management rights and responsibilities and the generation of rural incomes from wildlife actually had on the wildlife resource and the communal rural resource base more generally?

It is widely agreed that the strongest evidence of conservation success through the establishment of conservancies comes from the increase in wildlife populations. This is nowhere more evident than in the Kunene Region where the wildlife resource had dramatically declined. Aerial and road vehicle surveys conducted in recent years suggest that the wildlife numbers have generally recovered in Kunene Region and in many cases increased beyond their previous highest levels. Between 1982 and 2000, springbok, oryx and mountain zebra populations increased 10-fold and more in the Region, and high-value species like desert elephant, desert lions, and rhino are now more abundant again in areas from which they had virtually disappeared (NACSO, 2008). A similar pattern obtains for the Caprivi Region. Generally, without doubt the CBNRM programme has had favourable effects on the wildlife resource. Increased wildlife numbers are a clear indicator of success. It is the once-disenfranchised rural people themselves, now empowered by wildlife use and management rights vested in conservancies and motivated by substantial wildlife-and tourism-derived
benefits, that have been instrumental in achieving clearly visible wildlife conservation in communal areas.

Wildlife populations have increased in communal-areas conservancies not only through natural growth in the absence of poaching, but also as a result of significant wildlife translocations and (re-)introductions into conservancies. Such translocations and (re-)introductions, amounting to well over N$ 10 million in value, have helped extend the range of species like giraffe, Burchell’s zebra, black-faced impala, blue wildebeest and black rhino and restore these species in local areas where they had become extinct. Black rhino have been introduced to some conservancies that did not have these animals, contributing to Namibia’s reputation as the only country where numbers of black rhinos are increasing outside protected areas.

Human-wildlife conflict (HWC) remains a significant issue, all the more so as increasing wildlife populations enhance the frequency of such conflict occurring, for which there is clear evidence in communal areas endowed with substantial wildlife resources. In the five years between 2003 and 2007, more than 5,000 HWC incidences were reported by registered conservancies. Most of these incidences involved attacks on livestock, followed by crop damage. As long as the average benefits derived from wildlife substantially exceed the average costs of HWC by a wide margin, as is the case for conservancies (Barnes, 2002), HWC should remain a manageable problem. A number of approaches are being tested and used to deal with HWC. These include electric fencing of zoned animal corridors, special repellents to keep wildlife away from fields and gardens, human animal conflict conservancy self-insurance schemes (HACCSSIS) paid for (in part) from conservancy income and problem animal strategies.

Effective natural resource management is critical to the success of conservancies. Different resource management and monitoring systems have been developed over the years to help conservancies improve their capacity for adaptive resource management. Conservancies have appointed local officers, referred to you as community game guards, community rangers or environmental shepherds, to be in charge of natural resource monitoring. A set of information collection and disseminating tools assist conservancy monitoring and decision-making. These include a participatory conservancy mapping service, the so-called event book system (specifying procedures for day-to-day data collection, monthly and long-term reporting, and periodic collaborative game censuses involving conservancy staff/members, MET and NGOs), a participatory game quota setting and harvest strategy development tool, a visual conservancy management performance indicator tool, and a comprehensive digital information system (CONINFO).

While great strides have been made toward effective, adaptive natural resource management, a number of challenges remain. These include:

• Moving from wildlife management to more integrated management approaches covering other natural resources like grazing, livestock and crops by putting in place land use and conservation planning systems that can help achieve greater harmony between potentially
conflicting land uses and contribute to optimizing returns from land use (see section 4.2.2)

- Devolving further rights and responsibilities over wildlife and other resources like rangelands, forests and freshwater and ensuring equitable distribution of benefits from the use of these resources
- Adapting the current inter-institutional conservancy support service (Natural Resource Group working group) to meet changing needs and ensuring its financial sustainability
- Evolving more collaborative approaches between conservancies and other adjacent conservation areas (protected areas, freehold wildlife farms/conservancies areas or wildlife concessions) in order to create greater contiguous conservation spaces and enhance benefits from wildlife and tourism
- Improve the game quota setting system to maximize sustainable benefits and cope with the effects of climate variability and change

4.2.1.9 Local Institutions and Governance

Communal-area conservancies are legal bodies created for the management of common property resources, in particular wildlife. Conservancies provide structures within which rural people can interact, plan and make informed decisions toward the realization of common goals. The conservancy approach rests on the following by now established principles:

- Devolution of use/management rights and responsibilities to the lowest appropriate level
- Collective proprietorship and tenure over resources in defined geographic areas
- Creation of appropriate incentives through empowerment and economic opportunities

The central hypothesis, by now largely confirmed through experience, is that if people are provided with sufficient management authority over wildlife and if they are also empowered to derive benefits from wildlife, then wildlife will be used and managed sustainably (NACSO, 2008).

A legal pre-condition for any conservancy is to have created a functional local management institution, with a defined membership, a committee representing the membership, and a constitution setting out what the institution will do and how it will be governed. For sound resource management to happen, it is critical that these management institutions function effectively, with the necessary capacity to make informed decisions and with the necessary transparency and accountability in decision-making processes. Over the years, much effort has gone into strengthening Namibia’s 55 conservancies to build their institutional and technical capacities and develop their governance systems.

This effort has been directed, in particular, at the following aspects of decision-making and governance in conservancies:

- **Representation** – achieving broader and better representation of members and transparency in decision-making: through sub-division of conservancies into geographical sub-units each to be represented in the committee, stronger female participation at both membership and committee levels, and inclusion of other local structures and interest
groups (such as local farmers associations, water point committees, community forest committees, traditional authorities, women’s and youth groups).

- **Annual General Meetings (AGMs)** – making them more effective and transparent, through appropriate training and learning by doing, in electing or removing committee members, reviewing and vetting financial reports, budgets and annual work plans prepared and presented by committees, and demanding accountability from committees.

- **Constitutions** – adapting constitutions to changing circumstances (most conservancies have found this necessary) and involving members and stakeholders in processes of amending constitutions to enhance ownership.

- **Financial management and sustainability** – emphasizing the development and use of sound bookkeeping systems, appointing financial administrators to manage conservancy finances, developing financial sustainability and business plans, and reducing operational costs by limiting expenditures to essential items.

- **Participation in decision-making** – devolving decisions to geographical sub-units to ensure broader member participation.

- **Communication** – holding local sub-unit meetings and extraordinary general meetings, convening regular conservancy cluster meetings (e.g. in Kunene), regular feedback to residents after committee meetings, using radio programmes to communicate messages, creating regional conservancy associations to share experiences and form advocacy platforms, and translating constitutions into local languages.

- **Local-level monitoring** – monitoring conservancy activities and impacts (by members and committees), tracking the performance of staff and committee, monitoring institutional development, management and compliance issues based on the Event Book system (special initiative by Caprivi conservancies), monitoring conservancy impacts on member livelihoods and quality of life (initiative under development in Kunene).

- **Women’s participation** – further enhancing already significant female participation in chairpersonships (2 in 2007) committees (37% in 2007), staff (27% in 2007), and as financial officers (62% in 2007).

- **HIV/ AIDS** – using conservancies as vehicles for promoting disease awareness and related issues, developing conservancy HIV/ AIDS policies, distributing relevant materials, mainstreaming HIV/ AIDS issues through dedicated sessions during meetings, drama groups, radio programmes, monitoring traditional medicinal plants, setting up health gardens to improve nutrition, and financially supporting affected and infected people.

Progress has been made, but challenges remain. These include: approaches to managing benefits (ensuring equitable distribution of benefits to members through equal share for all versus concentrating benefit distribution on particular geographical sub-units or local interest groups, with the latter gaining in popularity); forging links to important external actors and stakeholders such as the Communal Land Boards and private sector organizations; and spotting, grooming and training tomorrow’s local leaders.
4.2.2 Community Forests

4.2.2.1 Origins and Legal Base

The concept of decentralized community-based management of natural forests was formally introduced in Namibia in 1996, with the Namibia Forestry Strategic Plan of 1996 (NFSP, 1996). This Strategic Plan presents “Community-Based Management of Natural Forests” as one of four priority programmes. Noting that “most productive natural forests in Namibia are found in the communal areas”, the NFSP argues that “involvement of local communities in management and conservation of forest resources is desirable for the purposes of environmental protection and for the increased production of forest products”. Active participation of rural communities in forest management is proposed to be achieved by granting the local communities ownership and tenure rights to forest resources. The NFSP marked the beginning of a national policy -- formalized through the Forest Development Policy of November 2001 and the Forest Act of 2001 – of devolving forestry management responsibilities to local communities while at the same time enhancing their forest management capacities.

The NFSP was followed up, a year later (1997), by a community forest pilot programme which was aimed at testing the concept of community-based forest management by setting up and operating a number of community forests on an experimental basis. Once a legal basis for community forests had been created with the promulgation of the Forestry Act later in 2001, it was possible to turn the pilot community forest structures into legal entities empowered to run their own affairs, but still overseen and assisted by the Directorate of Forestry. This happened in February 2006 when the first 13 community forests were gazetted – the only community forests gazetted to date15.

The (revised) Forest Development Policy of November 2001 has nine strategic objectives of which two deal with community forestry and benefit-sharing: “to implement the strategy for community involvement in forestry in the whole country” (No.4), and “to uphold the principles and practices of forest production or conservation for national and global benefits”. The Forestry Act No.12 of 2001, which was amended in 2005 to reflect the transfer of the Directorate of Forestry from MET to MAWRD, provides for different categories of forests -- Classified Forests (including State Forest Reserves), Regional Forest Reserves, Community Forests (Section 15), and Forest Management Areas – and prescribes the preparation of management plans for each category of forest, making specifications for what these management plans should cover.

According to Section 15 of the Forestry Act, the formal establishment of a community forest requires a written agreement between a representative body of the persons having rights over the respective communal land and wishing to establish the community forest and the Minister

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15 Another 10 community forests have formally applied and will be gazetted in the near future.
(MAWF), with the consent of the relevant chief(s) or traditional authority(ies) or any other body authorized to grant communal land rights (viz. relevant Land Boards). This defines the members of a community forest as people (residents or non-residents) with rights over the communal land. The written agreement shall:

- identify the geographical boundaries of the proposed community forest;
- include a management plan for the proposed community forest;
- confer rights, subject to the management plan, to manage and use forest produce and other natural resources of the forest, to graze animals and to authorize others to exercise those rights and to collect and retain fees and impose conditions for the use of forest produce or natural resources;
- appoint the body which is party to the written agreement to be the management authority to manage the community forest in accordance with the management plan;
- provide for equal use of the forest and equal access to the forest produce by members of the community forest;
- provide for adequate reinvestment of the revenues of the forest and for the equitable use or distribution of the surplus.

All management rights devolved to the community are vested in the community forest management body. The right to graze animals and to authorize others to do so provides significant powers over the control of livestock. The community forestry approach provides rights over all resources within a forest and considerable flexibility to define rights according to local circumstances.

### 4.2.2.2 Current Status

The community forest approach has now become an integral part of MAWF’s CBNRM programme. Based on the experience gained from pilot community forestry projects over the past 15 years, the Directorate of Forestry developed and published Community Forestry Guidelines which distil best practices and lessons learned. These Guidelines provide details about the functioning of community forests, including the development of a Constitution. The Guidelines envisage the development of a natural resource inventory and a provisional Forest Management Plan prior the community forest being declared by Government.

Given the variable bio-physical, socio-economic and cultural conditions across the country, there is no blueprint for community forests and the objectives of community forestry are formulated in broad, flexible terms:

- Contributing to poverty reduction and rural livelihood improvements through:
- Controlled harvesting and management of forest products for subsistence and/or commercial use
- Creation of employment opportunities
- Promotion of technical, organizational and marketing skills
- Sustainable land use planning that benefits not only forestry but also agriculture and livestock
- Reinforcing communities’ rights to communal land;
- Decision-making and conflict resolution right at the community level

The provisional Forest Management Plan, *inter alia*, should have a zonation map for different management purposes, demonstrate understanding of forest resource uses, management needs, and how forestry can contribute to poverty reduction and people’s livelihoods, and describe agreed benefit and cost sharing arrangements.

A total of 13 community forests have been gazetted in five Regions – Kavango (5), Caprivi (5), Otjozondjupa, Ohangwena and Omusati. Table 4-7 lists these community forests by Region, along with their areas, number of beneficiaries, annual incomes, the main sources of income. As of June 2009, the 13 gazetted community forests covered a total area of 465,000 hectares (4,650 square km), has about 37,000 beneficiaries, and generated a total annual income of approximately 420,000 N$. Another 38 community forests are currently emerging, of which 10 community forests will be gazette in the near future.

The concept of community forestry is still at a relatively early stage in Namibia. Most community forests have received little financial support so far, enterprise development is in its infancy, and generated incomes have been modest. Many of the CFs, particularly the emerging ones, are busy with developing or refining their resource inventories. Once resource inventories have been compiled, management and business plans can be developed.
### Table 4-7: Gazetted community forests as of June 2009 (Rolf Sprung, DED, Namibia, personal communication, 31/07/2009)

<table>
<thead>
<tr>
<th>No.</th>
<th>Name of community forest</th>
<th>Region</th>
<th>Area ( (\text{km}^2) )</th>
<th>No. of beneficiaries</th>
<th>Annual income 2008 (N$)</th>
<th>Main sources of income</th>
<th>Overlaps with following conservancies</th>
<th>Conservancy gazetted yes/no</th>
<th>Conflicts/problems with regard to</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ncaute</td>
<td>Kavango</td>
<td>129</td>
<td>1,000</td>
<td>3,500</td>
<td>Timber</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Ncumcara</td>
<td>Kavango</td>
<td>152</td>
<td>2,023</td>
<td>56,475</td>
<td>Timber, firewood, poles, crafts, cash crop cultivation, thatching grass</td>
<td></td>
<td></td>
<td>Illegal harvesting of forest products</td>
</tr>
<tr>
<td>3</td>
<td>Ncamagoro</td>
<td>Kavango</td>
<td>263</td>
<td>1,878</td>
<td>1,340</td>
<td>Timber, firewood, poles, crafts, cash crop cultivation, thatching grass</td>
<td></td>
<td></td>
<td>Illegal harvesting of forest products</td>
</tr>
<tr>
<td>4</td>
<td>Mbeyo</td>
<td>Kavango</td>
<td>411</td>
<td>1,633</td>
<td>52,190</td>
<td>Timber, firewood, poles, crafts, cash crop cultivation, thatching grass</td>
<td></td>
<td></td>
<td>Illegal harvesting of forest products</td>
</tr>
<tr>
<td>5</td>
<td>Hans Kanyinga</td>
<td>Kavango</td>
<td>277</td>
<td>4,000</td>
<td>26,165</td>
<td>Timber, thatching grass, firewood</td>
<td></td>
<td></td>
<td>Leasehold farms</td>
</tr>
<tr>
<td>6</td>
<td>Mkata</td>
<td>Otjozondjupa</td>
<td>870</td>
<td>700</td>
<td>22,110</td>
<td>Firewood, timber, medicinal plants, poles, rafts</td>
<td>N#a-jaqna</td>
<td>Yes</td>
<td>Fin. management, unreg. occupation of CF area</td>
</tr>
<tr>
<td>7</td>
<td>Bukalo</td>
<td>Caprivi</td>
<td>53</td>
<td>6,000</td>
<td>0</td>
<td>Timber, logs, firewood, poles, fruits</td>
<td>Salambala, Mulisi, Sikunga</td>
<td>Yes, No</td>
<td>Cooperation with Salambala Conservancy</td>
</tr>
<tr>
<td>8</td>
<td>Masida</td>
<td>Caprivi</td>
<td>195</td>
<td>1,100</td>
<td>142,473</td>
<td>Devil’s Claw, timber, poles, firewood</td>
<td>Sobbe</td>
<td>Yes</td>
<td>Performance of CC</td>
</tr>
<tr>
<td>9</td>
<td>Lubuta</td>
<td>Caprivi</td>
<td>190</td>
<td>1,000</td>
<td>25,015</td>
<td>Devil’s Claw, timber, poles, firewood</td>
<td>Mashi, Sobbe</td>
<td>Yes, Yes</td>
<td>Boundaries Lub/Sobbe</td>
</tr>
<tr>
<td>10</td>
<td>Kwando</td>
<td>Caprivi</td>
<td>200</td>
<td>3,200</td>
<td>15,275</td>
<td>Timber</td>
<td>Kwando</td>
<td>Yes</td>
<td>CF as a sub-unit of conservancy</td>
</tr>
<tr>
<td>11</td>
<td>Sikanjabuka</td>
<td>Caprivi</td>
<td>40</td>
<td>1,000</td>
<td>0</td>
<td>Poles</td>
<td>Mulisi</td>
<td>No</td>
<td>Boundary with Bukalo CF</td>
</tr>
<tr>
<td>12</td>
<td>Okongo</td>
<td>Ohangwena</td>
<td>755</td>
<td>1,250</td>
<td>39,212</td>
<td>Firewood, campsites, timber, hammer mill, permits, community facilities</td>
<td>Proposed conservancy</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Uukolonkadhi</td>
<td>Omusati</td>
<td>1,117</td>
<td>12,000</td>
<td>35,297</td>
<td>Permits, removal of bees, sale of poles and firewood</td>
<td>Uukolonkadhi - Ruacana</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

**Totals**: 4,652 36,784 419,152
4.3 CBNRM, Tourism and Climate Change

4.3.1 The Impact of Climate Change on Global Tourism Activity and the Contribution of Global Tourism to Climate Change

The global travel & tourism industry comprises a range of diverse and interdependent economic activities. International tourism satellite accounting\(^{30}\) suggests that the global travel & tourism industry contributes as much as 10% to the value of global economic output (goods and services produced worldwide) and 8% of global employment. In order to sustain the economic impact of the global tourism industry, it is necessary to understand the likely impacts of global climate change on global tourism, so as to be able to address the challenges that are emerging while grasping the opportunities presented by climate change.

There is increasing awareness of the need for new sustainable development strategies and business models that decouple tourism growth from increased GHG emissions. There is evidence from consumer surveys that international tourists are becoming increasingly aware of the impacts of their own travel & tourism activities and increasingly willing to pay premiums for tourism packages offering greater sustainability and reduced carbon footprints. It is being recognized that those tourism companies most able to adapt to the effects of climate change on the global tourism market by integrating sustainable business practices into their tourism products will be the ones most likely succeed in future. This means that the tourism industry needs to be seen to act responsibly and reduce its own GHG emissions and environmental impact by offering low-impact, non-polluting and sustainable tourism products (WTTC, 2009 as cited in Davidson, 2009).

The tourism sector has been referred to as both a “victim” and a “vector” of climate change – it is impacted by climate change while at the same time contributing to it. Tourism is a significant vector of climate change to the extent that it contributes to global GHG emissions. Over 800 million people cross international boundaries every year. Global tourism, including domestic travel, is responsible for an estimated 5% to global CO\(_2\) emissions (and as much as 8% of total GHG emissions)\(^{31}\). In 2005, as much as 75% of global GHG emissions from tourism resulted from transporting visitors from origin to destination, and more than half of that was due to air travel. Long-haul air travel, in particular, contributed 17% of global tourism-related CO\(_2\) emissions while representing less than 3% of all tourism trips. It is a small wealthy minority (less than 3% globally) that engages in international air trips, and reducing the frequency of such trips would (be seen to be) a small but impactful way of making a contribution to mitigating climate change (Davidson, 2009).

\(^{30}\) International tourism satellite accounting is carried out by the World Travel & Tourism Council (WTTC) based on an international standard developed by the UN World Tourism Organisation (WTO) (WTTC, 2007).

\(^{31}\) This includes emissions of N\(_2\)O and other greenhouse gases other than CO\(_2\).
As far as tourism as a victim is concerned, a recent UNWTO report identifies several categories of climate change impact affecting the competitiveness and sustainability of tourism destinations (UNWTO, 2007 as cited in Davidson, 2009):

- **Direct climatic impacts** – recognizing that climate is a resource helping to shape the appeal of travel destinations and tourism locations and that climate influences operating costs;
- **Direct impacts** -- in terms of climate change-induced local environmental change -- including habitat change, changes in landscape characteristics, changes in vegetation cover, biodiversity loss, decreasing water availability, increased frequency and severity of natural hazards (droughts, floods), coastal erosion, and increased incidence of vector-borne diseases (like Malaria);
- **Indirect impacts** – via the effect of climate mitigation policies on tourism costs, demand and travel patterns – international and national climate change mitigation policies, mechanisms and standards, including mandatory emission ceilings, carbon cap and trading schemes, and carbon taxes, end up raising the cost of (air and road) travel to consumers, lowering demand and shifting travel patterns and modes;
- **Indirect impacts** – via the effects on consumer awareness (and willingness-to-pay) and associated changes in consumer demand for tourism from the real/perceived contribution of tourism to climate change and environmental degradation – these indirect impacts may be of particular relevance for long-haul destinations having sensitive landscapes and having relatively wealthy, educated, informed and environmentally concerned overseas consumers as their primary tourism clientele (as in the case of Namibia).

### 4.3.2 Implications for Tourism in Namibia

How exactly climate change will affect Namibia’s tourism resource (bullet points 1 and 2 above) and tourism sector is not clear. To date, no specific study has been undertaken to examine the direct impact of climate change on tourism in Namibia.

However, studies have been undertaken into the impact of climate change on vegetation and ecosystems in Namibia (Midgley, 2005) and a climate change vulnerability assessment has been carried out for Namibia, with a particular thematic focus on the agriculture and water sectors (DRFN, 2008). These studies suggest that in the medium to long term, Namibia’s climate is likely to show even greater weather variability than today in terms of the distribution of rainfall and temperature in space and time, even greater unpredictability than today of the beginning and end of rainy and growing seasons, and more frequent and severe natural disasters (droughts and floods). Average climatic conditions are projected to become hotter and drier, with possible shifts in some ecological regimes (such as the projected shift further south of the winter-rainfall zone in the southwest of the country). Furthermore, there is projected to be a general decline in vegetation cover and net primary productivity as well as significant change in vegetation structure and function, with some of the grassy savannah converting to arid and desert shrubland. These changes would have a significant impact on agriculture and livestock.
They are also likely to affect tourism in Namibia, since most of the tourism activity in Namibia is nature-based, including landscape and game viewing and trophy hunting, and thus dependent on the integrity of the natural resource base. Specifically loss of habitat, loss of biodiversity and increases in temperature, humidity and malaria would impact negatively on tourism. On the other hand, it has been suggested that to the extent that climate variability and change will shift viability of land use systems away from agriculture and livestock production systems based on exotic species toward indigenous biodiversity production systems, climate change impacts on the tourism resource might not be as significant as in other sectors in Namibia and the tourism potential might even expand (Brown, 2007 as cited in Davidson, 2009). A study on the impact of climate change on protected areas in Namibia, currently underway, is expected to shed more light on the impact of climate change on Namibia’s natural tourism resource.

Whatever the direct impacts on the tourism resource (points 1 and 2) for Namibia, the indirect impacts (points 3 and 4) of climate change on the tourism sector are considered likely to be of greater relevance to the future of the country’s tourism sector. In particular, there is evidence of significant changes in international consumer awareness and attitudes, with increasing consumer concerns regarding the issue of long-haul air travel to reach far-away tourism destinations and the contribution of long-haul air travel to climate change. There is evidence from international consumer surveys that these consumer concerns are resulting in greater consumer reluctance to engage in such travel for tourism purposes and greater willingness-to-pay for tourism products and services that are environmental more friendly and have a smaller carbon footprint (Davidson, 2009).

Given growing international consumer concerns about the contribution of tourism to climate change, it has been suggested that Namibia should address these concerns and respond to growing demand for “sustainable” tourism by exploiting for marketing purposes Namibia’s negligible carbon footprint (the country is effectively a net carbon sink) and its excellent reputation for nature conservation (38% of the country is under one or the other kind of conservation regime) and in particular pro-poor nature conservation (CBNRM initiatives combining rural development with sustainable natural resource management objectives make up nearly 15% of the country). Building on this reputation, Namibia should actively seek to market the country as a “carbon-neutral”, “fair trade”, “pro-environment” and “pro-poor” tourism destination. To this end, Namibia should explore available certification opportunities (eco-certification, fair-trade certification, carbon credit certification), support use of appropriate technology (renewable energy use) in the tourism sector, develop carbon offset products32, and link the production and sale of fully certified carbon credits with existing

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32 The global carbon offset market is the “non-legally binding” segment of the global voluntary carbon market which has emerged alongside the much larger compliance market facilitating mandatory emission reductions through the Clean Development Mechanism and other flexible mechanisms. Players in the carbon offset market trade (sell and buy) carbon offsets (also called carbon credits). Buyers of such credits include companies wishing to reduce their carbon footprint in the interest of corporate social responsibility or for other reasons.
high-quality conservation, sustainable resource management and pro-poor rural development programmes, under an appropriate brand name\(^3\) (Davidson, 2009).

**4.3.3 Contributions of CBNRM to Climate Change Mitigation and Climate Change Adaptation**

**4.3.3.1 Contributions to Climate Change Mitigation and Related Benefits**

The conservancy programme provides tangible evidence of improved management and more sustainable use of natural resources and a healthier and diverse local resource base, which can be ascribed to the devolution of wildlife resource management rights and responsibilities and the generation of rural incomes from wildlife (see sub-section 4.2.1.6). While the main positive effect so far has been on the management and state of wildlife populations, conservancies are increasingly lending their institutional structures to assist in improving the management of other natural resources, such as rangeland and high-value natural products, and are also more closely cooperating with other CBNRM structures and programmes (such as the community forests) to move toward more integrated natural resources management.

Such efforts aimed at sustainable, integrated resource management address widespread problems of environmental degradation, as manifested in desertification and deforestation processes, seeking to ensure the integrity of the overall natural resource base, not just wildlife resources. To the extent that these efforts are successful in reducing land degradation and deforestation, they will result in reduced carbon emissions. In the same vein, to the extent that such efforts effectively enhance the integrity of the natural resource base, they will tend to improve the capacity of soils, vegetation and forests to store carbon. Reduced carbon emissions from ecosystems and enhanced ecosystem capacity to store carbon both contribute to climate change mitigation, as less carbon enters the global atmosphere. The positive effect of CBNRM on carbon accumulation in the global atmosphere and hence on global warming and climate variability and change constitutes a global impact that benefits not specifically Namibia and is extremely small (essentially negligible), given the tiny amounts of carbon involved (relative to the carbon contained in the atmosphere).

CBNRM (not only conservancies but also community at least in principle) does, however, offer opportunities to generate tangible (indirect) national and local benefits. One potential national and local benefit is to produce and sell carbon credits in the global informal carbon offset markets. Such credits could be produced by conservancies through eco-tourism

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Sellers of such credits include initiatives that have been certified as having effectively reduced carbon emission sources and/or increased carbon sinks and wish to improve the viability of their initiatives through the extra money earned by selling the offsets. Carbon offsets/credits are generated through interventions that reduce carbon emissions and or enhance carbon storage beyond what would happen in the absence of these interventions, on the basis of the principles of additionality, permanence, non-leakage and no double-counting.

\(^3\) A brand name like “Community conservation Namibia” has been suggested.
projects and other suitable rural enterprise development initiatives and be used by the conservancies as a source of additional finance for these projects, thus improving the financial profitability and economic viability of these projects and ultimately adding to rural incomes and livelihoods.

Other potentially very substantial national and local benefits may be derived by using the carbon performance of conservancies (or conservancy projects), along with other qualities of conservancies, as a means to internationally market the conservancies and Namibia as a tourism destination (see section 4.3.2).

Specific resource management approaches, measures and interventions by which conservancies have contributed or might contribute to reduced ecosystem carbon emissions and/or enhanced ecosystem carbon storage, while contributing to biodiversity conservation, include (Jones, 2007):

- Providing biological corridors between protected areas, as a way of countering habitat fragmentation and/or contributing to the establishment of a mosaic of interconnected terrestrial multiple use-reserve protected areas;
- Improving the management of grasslands and restoring or enhancing the quantity and quality of grazing resources through holistic range management;
- Helping to maintain forests (and prevent or reduce deforestation) by maintaining wildlife habitat, particularly in the Caprivi.

Again, the main climate change mitigation related benefit for the conservancies and Namibia of these measures lies in the potential to earn carbon credits and to use carbon performance for tourism marketing purposes, rather than in mitigating climate change globally and for Namibia.

4.3.3.2 Contributions to Climate Change Adaptation in Namibia

Conservancies spread wildlife-based land use systems, contribute to rural development and poverty reduction through enhanced rural income generation, diversity land use systems away from traditional systems based on livestock and agriculture, and in this way diversify rural income sources and livelihoods. All of these effects improve the capacity of rural ecosystems, rural land use systems, and rural livelihood systems to adapt to the effects of climate change.

Wildlife is known generally to be better adapted to the ecological and weather conditions in drylands than livestock. Climate change is projected to accentuate the variability in weather patterns already found in the drylands today. This implies that wildlife can be expected to be more resilient and adaptable to projected climate variability and change. For this reason, wildlife-based land use systems tend to be more appropriate and productive and have higher economic returns under marginal dryland conditions, which translates into greater capacity of wildlife-based land use systems to adapt to future climate variability and change.

Rural development through conservancies increases the resources rural people have to cope with the impact of future climate variability and natural disasters like droughts and floods on
their livelihood systems. This makes rural people less vulnerable and increases their adaptive capacity.

Finally, diversified systems, whether ecological or socio-economic, are intrinsically more adaptable to external and internal changes. This implies that both land use diversification and associated income diversification, brought about through conservancies, contribute to climate change adaptation.

### 4.4 Data Availability and Archiving

#### 4.4.1 Tourism Statistics and Satellite Accounts

The Namibia Tourism Board and the Directorate of Tourism of MET, in collaboration with the Ministry of Home Affairs, collect and publish on an annual basis a range of data and information on aspects and indicators measuring the performance and economic impact of tourism in Namibia.

Tourism sector statistics cover a range of performance aspects and indicators of tourism activity in Namibia (MET, 2008a), such as those found in Table 4-1 and Table 4-2 (section 4.1.3): international/foreign arrivals; international/foreign tourist arrivals; point of entry into the country; transport mode of arrival (air, land); purpose of visit (holidays/leisure, visiting friends/relatives, business, other); seasonality and length of stay; country/region of origin; tourism destination in Namibia; accommodation capacity; visitor expenditure.

The tourism satellite account (TSA) is an extension of the standard National Accounts which are published on an annual basis. Two editions have so far been published, with firm data for 2005 (WTTC, 2007) and 2006 (NTB, 2008), preliminary data for 2006 and 2007, estimates for 2007 and 2008, and forecasts for 2016 and 2017, respectively. The TSA measures the economic performance and impact of the tourism sector, on the basis of indicators such those found in Table 4-3 (section 4.1.4). The TSA measures total tourism demand (expenditures of tourists in Namibia) as well as the income and employment contributions to the national economy of both the travel & tourism industry (direct effects) and the national tourism economy (direct plus indirect effects).

Additional tourism data are generated through tourist exit surveys.

#### 4.4.2 Data Collection and Archiving for the National CBNRM programme

The Conservancy programme collects economic, social and environmental performance data and information for all conservancies on an ongoing basis. This includes data on aggregate performance indicators like total area covered by and total number of people living in conservancies (see Figure 4-1), total incomes generated by conservancies (see Figure 4-2), and overall contribution to the national economy (see Figure 4-6). Aside from total area under community conservation, environmental performance indicators for which data are collected on a regular basis using standards methodologies include the size of wildlife
populations on a species by species basis (data generated through annual vehicle road surveys and less frequent aerial surveys).

An Event Book system has been introduced as a basis for the systematic day-to-day monitoring of environmental indicators and events which is being extended to cover social and economic events and process indicators as well. This includes indicators such as: human-wildlife conflict (HWC) events (human attacks, livestock attacks, crop damage, and other damage); frequency of and degree of participation in conservancy committee AGMs; conservancy staff performance; impacts of the conservancy on its members; types of benefits generated; and uses of financial benefits. The Event Book system also provide guidelines for the type and frequency of reporting by each conservancy.

Event, process and performance data from each conservancy are being collated and stored in a national conservancy information system (CONINFO) which comprises databases as well as metadatabases containing bibliographic information. CONINFO is in the process of being made accessible via the Internet.

A similar data and information system based on an adapted version of the Event Book system is being started by the Community Forest programme.

4.4.3 Gaps in Indicators and Data Collection

There are several important areas where the conservancy data collection and analysis effort needs to be extended, systematized and/or standardised:

- Performance indicators and data collection on the distribution of benefits within conservancies – to date, two socio-economic household surveys have been conducted (SEHS, 2002) and (SIAPAC, 2006), but methods for how to carry out these surveys and how to assess its results are still evolving and need to be standardized to allow performance tracking of conservancies and across conservancies over time.

- There are a number of gaps in the availability of livelihood impact related data – generally relating to the comprehensive analysis of both costs and benefits arising from CBNRM and related activities, and evidence of the extent of households affected by various impacts and the degree to which they are affected. Data on livelihood impacts have the following specific gaps (Suich, 2009):
  - No time series data/analysis
  - Little rigorous and standardized cross-sectional data/analysis
  - Little analysis of the opportunity costs associated with conservancies
  - Difficulty to get a clear picture of the net livelihood impact at the household livelihood level – and how the impact changes in different contexts
  - Gaps in analysis on HIV-AIDS, equity and gender
  - Little attention so far to newer lower-potential conservancies.
  - There is a need to extend natural resource monitoring to natural resources other than wildlife, in collaboration with the community forest programme and other CBNRM
programmes (rural water, freshwater, etc). This is already starting to happen in connection with a grazing resource management programme that IRDNC has been implementing over the past 6 years in northeastern Namibia, in collaboration with traditional authorities, the Ministry of Agriculture and Regional authorities. A biological monitoring system is being put in place in 10 grazing resource management sites. Aspects being monitored (over time, to obtain time series) include: soil cover, basal plant cover, soil organic content, and the return of perennial grasses (Colin Nott, IRDNC, personal communication, 12 August 2009).

4.5 References


DRFN (2008): Desert Research Foundation of Namibia and Climate Systems Analysis Group, Climate Change Vulnerability and Adaptation Assessment, undertaken for MET and UNDP, in preparation for Namibia’s Second National Communication to the UNFCCC,


Midgley, G. (2005): G. Midgley, Assessment of potential climate change impacts on Namibia’s floristic diversity, ecosystem structure and function, March 2005


Namibia Tourism Board Act 2000 (Act No.21 of 2000)


NPC (2005): National Planning Commission, Mainstreaming Environment and Sustainable Development into the National Poverty Reduction Action Programme (NPRAP) for Namibia, April 2005


WTTC (2009): World Travel and Tourism Council, Leading the Challenge on Climate Change, February 2009
4.6 Annex: Stakeholders Interviewed and Resource Persons Consulted

Ministry of Trade and Industry (MTI); Mr S. Motinga, Director: Industrial Development

Ministry of Finance (MoF); Mrs Dagmar Honsbein, Director, Economic Policy Advisory Services

Ministry of Agriculture, Water and Forestry (MAWF), Directorate of Forestry; Ms Helena Lutombi, Community Forestry

Ministry of Environmental and Tourism (MET), Directorate for Environmental Affairs (DEA); Dr Jon Barnes, consultant to Environmental Economics Unit Mr Benedict Libanda, Manager, Project on Country Pilot Partnership for Integrated Sustainable Land Management

Namibian Association of CBNRM Support Organisations (NACSO); Ms Maxi Louis, Head

Integrated Rural Development and Nature Foundation (IRDNC); Mr John Kafaona, Mr Garth Owen-Smith

CRIAA-SA-DC; Mr Pierre du Plessis

World Wildlife Fund (WWF), Namibia; Mr Chris Weaver, Head

Mr Brian Jones, Independent Consultant

Mr John Hazam, Consultant to the Legal Assistance Centre (LAC) and former CBNRM-Coordinator, Directorate of Parks and Wildlife Management, MET

Mr Rolf Sprung, Coordinator, Community Forests North-Eastern Namibia (CFNEN) Project, German Development Service (DED)

Other Stakeholders and Resource Persons Contacted:

National Planning Commission (NPC); Central Bureau of Statistics (CBS), NPC; Directorate of Tourism, MET; Namibia Tourism Board (NTB), MET; NACOBTA; Mr Alfons Mosimane, UNAM; UNDP (Ms Martha Mwandingi, Mr Ojjio, and Mr John Ashipala)
SECTION 5:

The impact of HIV/AIDS on the capacity to respond to challenges of climate change in Namibia

Erik Dirkx, DRFN, erik.dirkx@drfn.org.na
5 Impact of HIV/AIDS on the capacity to respond to challenges of climate change in Namibia

This chapter presents an attempt to link the discussion on the impact of HIV/AIDS on development to the debate on the impact of climate change in Namibia, with a focus on response capacities in a selected number of sectors. Thereto in the first section of this chapter the prevalence and incidence of HIV/AIDS in Namibia are presented, as well as the drivers of the epidemic. In the second section of the chapter the national response framework is presented, but attention is also paid to the response in the agricultural, environment and CBNRM sectors. The third section of this chapter elaborates the impact of HIV/AIDS in Namibia and covers a range of topics, such as demographic and health impacts, economic impacts and impacts on rural development, food security and environmental management. In section four the capacity to respond to the challenges and impacts of HIV/AIDS at national level and in selected sectors, such as the agricultural, environment and health sectors is elaborated. Section five then makes the linkage with the discussion on climate change and as such looks into matters of HIV/AIDS management in Namibia’s emergency management framework. The final sections present information on data gaps and provide policy recommendations.

5.1 HIV/AIDS in Namibia

This section elaborates how the HIV-prevalence evolved in Namibia and the implications this currently has for the number of new HIV infections. The major drivers of the epidemic in Namibia are also discussed.

5.1.1 HIV-prevalence and HIV-incidence

The first cases of HIV/AIDS in Namibia were identified in 1986 and since then the HIV infection has spread across the country. Evidence of the impact on the Namibian population can be found in the statistics of the various HIV Sentinel Surveys carried out since 1992, when the HIV prevalence amongst pregnant women aged 15-49 amounted to 4.2%. The HIV/AIDS pandemic grew steadily during the 1990s until the prevalence rate amongst pregnant women reached a peak of 22% in 2002. The prevalence rate amongst pregnant women has diminished during the last three Sentinel Surveys and amounted to nearly 18 percent in 2008.

The HIV-prevalence rate amongst pregnant women aged 15-49 in 2008, which is based on the HIV Sentinel Surveys, corresponds to an estimated HIV prevalence rate in the total Namibian population aged 15-49 years of 15 percent (MHSS 2008b). The estimated prevalence in the population aged 15-49 is expected to reach 16 percent by 2012/13, which suggests a stabilising of the epidemic. As such it is estimated that in 2007/08 approximately
204,000 adults and children were living with HIV/AIDS in Namibia, of which 7% were under the age of 15.

Figure 5-1: HIV prevalence amongst pregnant women aged 15-49, 1992-2008 (MHSS 2008a).

Although the prevalence rate amongst the population aged 15-49 seems to stabilise towards 2012/13, the absolute number of adults and children living with HIV/AIDS is expected to increase to about 247,000 in 2013. This is due to the fact that the absolute number of people in the 15-49 year age bracket will grow in the next five years, since the population pyramid reflects a relatively young population structure. Moreover HIV-positive people are expected to live longer as treatment programmes have been expanded in the public and private sectors; this is reflected in an increase of the HIV prevalence rate amongst 35-39 year olds (MHSS 2008a; MHSS 2008b; NPC 2009).

The HIV prevalence in the general population corresponded with a HIV-incidence of 14,100 new infections per year in 2007/08. This incidence is expected to rise to approximately 16,300 new infections per year over the next 5 years (MHSS 2008b). A large proportion of new infections, 44 percent, are expected to happen amongst young people aged 15-24 years. And of these new infections amongst young people 77% are estimated to happen amongst young women and 9% amongst children less than 15 years of age.

The vulnerability of women to HIV is underscored by the proportion of women in all people with HIV/AIDS has over the last 10 years increased to 60% in 2008. The vulnerability of young women in particular is attributed to the different factors. First of all women are biologically more prone to contract HIV during intercourse then men and secondly, condom use amongst women aged 15-24 appears to be less common than amongst young men in the same age bracket. The latter suggests that trans-generational and transactional sex amongst younger women influences their capacity to negotiate the use of condoms and thus increases the risk of young women of becoming infected (NPC 2009).
Notwithstanding the projected increase of the HIV-incidence in the next five years, there are tentative signs that prevention measures in Namibia have started having some effect, as the HIV-prevalence rate amongst teenagers (15-19 years) and youths aged 20-24 years has been reduced over the last 8 years. For the 15-19 year olds it reduced from 12% in 2000 to 5.1% in 2008 and for the 20-24 year olds from 20% to 14.0% (NPC 2009; MHSS 2008a).

5.1.2 Drivers of the HIV/AIDS pandemic in Namibia

The major drivers of the HIV/AIDS pandemic in Namibia are related to the following factors (MHSS 2008e):

- Multiple and concurrent partnerships
- Intergenerational and transactional sex
- Perceptions of HIV risks
- Alcohol abuse
- Mobility and migration
- Marriage at later age and changing norms regarding sexual partnerships
- Low and inconsistent condom use
- The sections below each elaborate one of the above mentioned drivers of the pandemic.

5.1.2.1 Multiple and concurrent partnerships

Multiple and concurrent partnerships have been identified as an important contributor to high levels of HIV in Southern Africa. Concurrent partnerships are more problematic for the spread of the epidemic than sequential relationships. In the case of sequential partnerships an infected person may only infect a new partner once the old relationship has been terminated and a new partner is found. This causes some delay in the spread of the virus. With concurrent partnerships there is a risk of immediately spreading the virus to multiple partners,
especially with persons who have been recently infected themselves, because viral loads are highest in the first 6 to 8 weeks after infection (MHSS 2008e).

Whereas certain studies suggest that up to 40% of Namibian men had multiple partners in the previous 12 months (MHSS 2008e), the 2006/07 Namibia Demographic and Health Survey, with more conservative figures, underscores that multiple partnerships applied to 16 percent of sexually active men and to 3 percent of sexually active women. Multiple partnerships are not common amongst women older than 30, but continue to be common amongst men into their 40’s as is depicted in figure Figure 5-3.

Although a certain share of the men that are older than 40 still have multiple partners, multiple and concurrent partnerships are most common among youths under 30 years of age. One in four in men in the age group of 20-24 years and one in five men aged 25-29 respectively, had multiple partnerships in the previous year (2006/07 NDHS). Thus, HIV-infection is quickly reproduced within that generation. Apart from young men, more educated, employed and wealthier men are more likely to report multiple partners (MHSS 2008e; NDHS 2008).

Figure 5-3: Proportion (%) of sexually active respondents by age group and sex, reporting more than one partner during the last 12 months (NDHS 2006/07; MHSS 2008e).

Although the data above indicate that multiple and concurrent partnerships are quite common amongst younger men, trends between the two latest demographic and health surveys (i.e. between 2000 and 2006/07) indicate that the practice of multiple partnerships has declined amongst men (from 21 to 16 percent). No such trend could be observed amongst sexually active women. There are however some regional exceptions to the general trend observed amongst men; sexually active men in Caprivi and Kavango seem to have become more often involved in multiple and/or concurrent partnerships (MHSS 2008e).

Multiple and concurrent partnerships also spread the infection with STIs, a phenomenon which further accelerates the spread of the HIV-infection. However, STIs appear to particularly affect women with multiple and concurrent partnerships as Figure 5-4 shows. It should be noted however that overall few women have multiple partnerships. Those who do tend to be young (15 to 24 years), wealthy and employed, and they usually live in larger cities (MHSS 2008e).
Figure 5-4: Proportion of sexually active respondents aged 15-49, reporting an STI infection, by number of partners in the previous 12 months (MHSS 2008e).

5.1.2.2 Intergenerational and transactional sex

Intergenerational sex in Namibia is most common amongst young women (15-24) who are married or co-habitating; 27 percent of these women are involved in a relationship with someone who is more than 10 years older. This poses an increased risk of HIV-infection to the women concerned, as the HIV-prevalence amongst older men, especially those aged 35 to 45, is considerably higher than amongst men of their own age. In addition, generally women who are engaged with older men are also more likely to have multiple partners. Young women in non-marital relationships moreover appeared to be less likely to use condoms during intercourse. The combination of these factors enhances the faster spread of the virus amongst the women concerned (MHSS 2008e).

Table 5-1: Proportion of women aged 15-24, reporting a partner 10 years older or more, by marital status and region (NDHS 2008, MHSS 2008e).

<table>
<thead>
<tr>
<th>Region</th>
<th>% of married/cohabiting women whose partner is 10+ years older</th>
<th>% of non-married women who had sexual relations with a partner 10+ years older</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caprivi</td>
<td>28.6</td>
<td>5.1</td>
</tr>
<tr>
<td>Erongo</td>
<td>16.5</td>
<td>11.4</td>
</tr>
<tr>
<td>Hardap</td>
<td>22.6</td>
<td>11.7</td>
</tr>
<tr>
<td>Karas</td>
<td>36.7</td>
<td>7.7</td>
</tr>
<tr>
<td>Kavango</td>
<td>22.9</td>
<td>1.7</td>
</tr>
<tr>
<td>Khomas</td>
<td>25.3</td>
<td>9.2</td>
</tr>
<tr>
<td>Kunene</td>
<td>38.5</td>
<td>8.2</td>
</tr>
<tr>
<td>Ohangwena</td>
<td>42.8</td>
<td>7.5</td>
</tr>
<tr>
<td>Omaheke</td>
<td>28.9</td>
<td>11.4</td>
</tr>
<tr>
<td>Omusati</td>
<td>53.3</td>
<td>7.7</td>
</tr>
<tr>
<td>Oshana</td>
<td>30.4</td>
<td>7.6</td>
</tr>
<tr>
<td>Oshikoto</td>
<td>25.8</td>
<td>8.1</td>
</tr>
<tr>
<td>Otjozondjupa</td>
<td>29.6</td>
<td>10.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>27.0</strong></td>
<td><strong>8.0</strong></td>
</tr>
</tbody>
</table>

The prevalence of intergenerational sex reveals marked regional differences in Namibia. Among married or cohabitating women, the highest prevalence of intergenerational
partnerships is registered in the Omusati and Ohangwena regions, where 53 percent and 43 percent of young married women respectively have a partner 10 or more years older. The women concerned are particularly vulnerable as condom use amongst spouses in these regions is reportedly very uncommon (MHSS 2008e).

Apart from intergenerational sex, it appears that transactional sex has become increasingly acceptable in Namibia (MHSS 2008e). In transactional relationships sex is exchanged for food, money, gifts, drinks or other favours. It is allegedly more common amongst young men and women who have limited employment opportunities; through sexual relations with wealthier men they obtain access to resources. In this regard it is illustrative that women, who participated in qualitative surveys on attitudes and practices during the last few years, consistently reported that they selected partners on the basis of their employment status, as well as type of employment. Likewise, ‘sugar daddies’ and ‘mummies’ are reportedly considered as desirable partners by young women and men.

Although it is usually assumed that transactional sex is related to widespread poverty and income inequality, it is a misconception to completely attribute it to absolute poverty. Rather, transactional sex should be seen as way of obtaining goods and services beyond one’s own means and as a way of improving one’s personal material well-being (Mufune 2003).

### 5.1.2.3 Perceptions of limited risk of HIV-infection

The 2006/07 NDHS underscores that in general knowledge of HIV/AIDS has improved. Gaps in knowledge about HIV/AIDS appear to be limited to poor rural and remote segments of the population (MHSS 2008e, NDHS 2008). As such, it is surprising that qualitative studies have confirmed that some degree of denial of the risk of HIV-infection can be observed amongst certain segments of the population, in particular amongst young men aged 15 to 24 years (MHSS 2008e). Despite high-risk behaviour involving multiple partners and inconsistent condom use, as many as 62 percent of men aged 15 to 24 in five high prevalence communities did not believe they were personally at risk of contracting HIV (SIAPAC 2005). Le Beau and Mufune (2001) believe that this should not be considered as the denial of risk per sé, but rather as a form of resignation that is related to the fact that the individuals concerned believe that nothing much can be done to prevent infection. Other people at the same time do not believe in the efficacy of condoms. Such perceptions are according to the authors most common amongst the poor and unemployed in urban centres. Furthermore Le Beau and Mufune (2001) reason that for some the risk of acquiring HIV is a concern, but for others it is not such an important matter, because they are so poor that they are more concerned with finding food, an income or employment than with a disease that may only manifest in a couple of years time.

### 5.1.2.4 Alcohol abuse

Figure 5-5 depicts to what extent alcohol consumption and alcohol abuse are likely to contribute to the spread of the pandemic in Namibia, as they increase the chances of sexually risky behaviour. This is mostly due to the fact that alcohol consumption is associated with
having multiple partners, because it clouds judgment, removes inhibitions and possibly reduces concerns about HIV infection. Bars and shebeens moreover serve as hubs where new partners can be found. Contrary to popular belief or expectation, alcohol abuse is not necessarily associated with irregular or inconsistent condom use (MHSS 2008e).

Figure 5-5: Proportion of respondents aged 15-24 with multiple partners, by frequency of alcohol consumption in the past month (Source: 2006/07 NDHS; MHSS 2008e)

5.1.2.5 Migration and mobility

It is generally acknowledged that the movement of people has been an important driver of the spread of HIV in Southern Africa. Migrants have a greater risk of HIV infection since they usually have more partners than non-migrants. According to the NDHS, in Namibia migrants who travelled away from their place of residence e.g. reported higher likelihoods of multiple partnerships than those remaining in their home town or region (NDHS 2008). Factors that play a role in this regard are feeling lonely whilst being away from home and having fewer social contacts, anonymity, and the opportunity to meet new sexual partners. For a certain proportion of male Namibian migrants it is also common to visit commercial sex workers (MHSS 2008e).

However, the factors mentioned above do not exclusively explain the vulnerability of migrants. Other contextual factors such as limited access to health facilities at the place of destination and a higher prevalence of STIs and HIV in towns and regions to which migrants usually move, also play an important role (MHSS 2008e). Migration to informal settlements in urban areas that are characterized by poor and crowded living conditions and limited access to health care may further increase the vulnerability to infection with HIV, as relatively high levels of unemployment in the informal settlements increase the probability of transactional sex. Contract labour to remote towns, or employment conditions in the defence force or the fisheries sector, which provide certain limitations to maintaining long-term partnerships, also increase the vulnerability to HIV infection, as the migrants concerned may be more likely to get involved in multiple short-term partnerships. The same goes for individuals with professions in which a fair amount of mobility or travelling is required for their job (MHSS 2008e).
Generally, mobility of people is associated with areas of higher population density, such as urban centres, zones of industrial activity, e.g. in the mining and fisheries sector and border posts. As such it is not strange that in Namibia a relatively straightforward relationship can be observed between population density, mobility and the HIV-prevalence (see Figure 5-6).

**Figure 5-6: Map of HIV-prevalence by sentinel site and population density in 2006 (MHSS 2008e)**

5.1.2.6 Late marriage and norms regarding sexual partnerships

Bongaarts (2006) reveals that in 33 countries in Sub-Saharan Africa the average interval between the age at which sexual relations start occurring and the age of marriage is about 10 years. The practice to marry at relatively late age is believed to increase the spread of the HIV-infection, since it generally leads to a long period of pre-marital sex in which partners change relatively frequently. The report of MHSS on the drivers of the HIV/AIDS pandemic also underscores that a trend to marry later in life can be observed in Namibia between the Demographic and Health Surveys of 2000 and 2006, as is shown in Table 5-2. As the declining importance of marriage in society is associated with changing values about
premarital sex and early sexual debut, the vulnerability to HIV-infection is believed to have increased. The observed change in sexual norms appears most strong amongst the male youth, where peer pressure seems to play a role in having multiple partners (Thomas 2007; Mufune 2003; MHSS 2008e).

Table 5-2: Proportion of respondents that were ever married or co-habitated by age group (NDHS 1992 2000 and 2006; MHSS 2008e)

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Women</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1992 NDHS</td>
<td>7.7</td>
<td>31.1</td>
<td>53.1</td>
<td>74.2</td>
<td>80.8</td>
<td>81.1</td>
<td>88.1</td>
</tr>
<tr>
<td>2000 NDHS</td>
<td>6.1</td>
<td>27.8</td>
<td>46.8</td>
<td>64.4</td>
<td>76.6</td>
<td>82.0</td>
<td>86.9</td>
</tr>
<tr>
<td>2006 NDHS</td>
<td>5.5</td>
<td>24.1</td>
<td>44.6</td>
<td>60.2</td>
<td>69.2</td>
<td>73.9</td>
<td>82.9</td>
</tr>
<tr>
<td><strong>Men</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000 NDHS</td>
<td>2.5</td>
<td>18.5</td>
<td>34.1</td>
<td>56.2</td>
<td>78.5</td>
<td>88.3</td>
<td>89.2</td>
</tr>
<tr>
<td>2006 NDHS</td>
<td>0.4</td>
<td>12.9</td>
<td>34.5</td>
<td>52.1</td>
<td>68.5</td>
<td>78.7</td>
<td>82.8</td>
</tr>
</tbody>
</table>

No data available for men in 1992

5.1.2.7 Low and inconsistent condom use

Although there has been considerable improvement in recent years, condom use remains relatively low and inconsistent. According to the 2006/07 Demographic and Health Survey 41 percent of women and 57 percent of men used a condom during the last time they had sex. Condom use is far less common amongst married and cohabitating men and women. Less then one in five married individuals reported using a condom during the last sexual intercourse with their spouse. Amongst cohabiting couples, only a quarter of women reported using a condom during the last time they had sex, whilst 39% of men reported to have used a condom. Amongst non-married or non-cohabitating individuals condom use was approximately twice as common. There are however remarkable regional differences in condom use amongst non-married and non-cohabitating individuals. In Caprivi, Kavango, Ohangwena and Karas the proportion of such individuals that used a condom during the last time they had sex was considerable lower than in other regions of the country.

Figure 5-7: Proportion of individuals that reported condom use during the last time they had sexual intercourse by type of partner (NDHS 2008; MHSS 2008e).
Regardless of partner type, the poor, rural and uneducated are least likely to use condoms (MHSS 2008e). Overall though, condom use amongst non-married and non-cohabitating partners has improved in the period between the two latest demographic and health surveys. Amongst women it reportedly improved from 43% in 2000 to 62% in 2006 and amongst men it increased from 67% to 78% during the same period (MHSS 2008e).

5.2 The National Response on HIV/AIDS

This section briefly outlines the national response with regard to the mainstreaming of HIV/AIDS. It first describes the multi-sectoral response as coordinated by the MHSS through the National Strategic Plan on HIV/AIDS (MTP III). The next sub-sections present information on the efforts to mainstream HIV/AIDS in the agricultural, environment and CBNRM sectors. The reason to focus on these sectors is twofold. First of all, the sectors concerned are of utmost relevance in terms of responding to impacts of climate change. Secondly, in the sectors concerned some progress has actually been made with mainstreaming HIV/AIDS.

5.2.1 The National Strategic Plan on HIV/AIDS (MTPIII)

Given the steadily increasing rate of HIV-prevalence observed since the early 1990s, the number of people developing AIDS and the increase in AIDS-related mortality, the GRN formulated a multi-sectoral response to the HIV/AIDS epidemic: the National Strategic Plan on HIV/AIDS for the period 2004 – 2009 (MHSS 2004). The national response is based on an approach referred to as mainstreaming HIV/AIDS in organisations, programmes and communities, as the impact of the virus cuts across all spheres of development. This means that actions to mitigate the impact of the epidemic must be integrated into work in both public and private sectors. Mainstreaming strategies require agencies to include prevention measures, as well as treatment, care and support services into the day to day activities of the organization rather than setting up separate programs (NACSO 2009). In line with the need for mainstreaming the MTP III programme comprised five key result areas:

- **Enabling environment:** this component deals with creating an environment of leadership and anti-discriminatory practices in all sectors, aiming for the reduction of the stigma related to HIV/AIDS so that people would feel free to seek advice, counseling and testing, as well as treatment, care and support services. It comprised sub-components dealing with leadership development, the greater involvement of people living with AIDS (PLWHA), policy development and legal reform, and specific interventions to reduce stigma and discrimination.

- **Prevention of new HIV infections** through awareness raising and behavioural change communication (BCC). These efforts target vulnerable groups and young people in particular, as well as attention for gender factors in reducing vulnerability.

- **Treatment, care and support services:** this involves the provision of cost-effective and high quality treatment, care and support services for all people living with or affected by
HIV/AIDS, including: counseling and testing, primary health care support, provision of ART, home based care and/or palliative care.

- Mitigation: this concerns strengthening of local capacity to mitigate the socio-economic impacts of HIV/AIDS, such as addressing poverty and food insecurity of PLWHA and improving the plight of OVCs and PLWHA.

- Management and coordination of the multi-sectoral approach: This involved developing HIV/AIDS management capacity at all levels in all sectors to strengthen the response to the impact of the pandemic, including M&E services and research / surveillance.

The efforts to mainstream HIV/AIDS through MTP III were consolidated during the formulation of NDP3, as the fifth main objective of NDP3 dealt with the quality of life of the Namibian population. One of the goals in this Key Result Area is “Reducing the Spread of HIV/AIDS and its Effects”. For the greater part this chapter of NDP3 builds on the multi-sectoral approach to address the impact of HIV/AIDS as formulated in MTP III.

The Ministry of Health and Social Services furthermore formulated a National Policy on HIV/AIDS (MHSS 2007c) to provide an overall reference framework for all HIV/AIDS related policies in the country and to guide the national HIV/AIDS-response of all sectors in society. The policy is formulated around the same five objectives as the MTP III and can be used by sectors and agencies to formulate their own HIV/AIDS policies.

As HIV/AIDS needs a multi-sectoral response the MTP III and NDP3 outline the roles of many partners (MHSS 2004; NPC 2008). The Office of the Prime Minister (OPM) plays an important role in the implementation of workplace programmes in the public sector, whilst the National Planning Commission (NPC) is responsible for mainstreaming HIV/AIDS in sub-sector development plans and projects. Certain line ministries are responsible for specific mainstreaming efforts, as listed below:

- The Ministry of Regional and Local Government and Housing and Rural Development (MRLGHRD) is responsible for coordinating mainstreaming efforts at regional level;
- The Ministry of Gender and Child Welfare (MGECW) is responsible for strengthening support to OVCs;
- The Ministry of Agriculture, Water and Forestry (MAWF) is responsible for mitigating the impact of HIV/AIDS in relation to food security.

For the overall coordination of the national response to HIV/AIDS the following committees and structures have been put in place:

- The National AIDS Committee (NAC) consists of Cabinet Ministers and Regional Governors and serves as the highest policy making body on matters related to HIV/AIDS.
- The National Multi-Sectoral AIDS Coordinating Committee (NAMACOC) consists of Permanent Secretaries, Chief Regional Officers and Chief Executive Officers / Managing Directors of the private sector and civil society. It provides leadership for multi-sectoral and regional planning, implementation, monitoring and evaluation.
- The National AIDS Executive Committee (NAEC) consists of technical people from ministries and agencies that are responsible for the five components of the Medium Term

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Plan (MTP III). It serves as a technical secretariat and is responsible for coordinating the daily implementation of the multi-sectoral response.

- Sub-sector Steering Committees (SSCs) are responsible for implementation of sub-sector specific HIV/AIDS interventions and for mainstreaming HIV/AIDS into all aspects of their organisations’ functions.
- The Regional AIDS Coordination Committee (RACOC) coordinates the HIV/AIDS response in civil society and government agencies at regional level.

### 5.2.2 Mainstreaming HIV/AIDS in the public sector

The third MTP called for the mainstreaming of HIV/AIDS into the work of all government ministries. Although the implementation of MTP III started in 2004, most mainstreaming efforts are of more recent date, as is underlined by the mid-term review of MTP III (MHSS 2007a). The overall responsibility to promote workplace programs in ministries resides with the Office of the Prime Minister (OPM), which receives funding from UNDP for this purpose. In recent years the OPM facilitated the preparation of an HIV/AIDS policy for the public sector. In addition, guidelines for HIV/AIDS workplace programmes and the responsibilities of Focal Persons have been formulated, and a Monitoring and Evaluation (M&E) framework for the HIV/AIDS response in the public sector has been developed. The Focal Persons of O/M/As in the public sector subsequently received M&E training. Under the auspices of the OPM, workplace programmes were rolled out to the following six agencies in 2008: the Ministry of Labour of Social Welfare, the Office of the Prime Minister, the Ministry of Justice, the Ministry of Gender and Child Welfare, the Ministry of Veteran Affairs and the Ministry of Home Affairs and Information. Other sectors have received support from other donors and agencies for their mainstreaming efforts (see also the next section). Consequently, a number of public sector agencies have commenced planning and implementing HIV/AIDS response measures. In fact, whilst 8 agencies out of 30 O/M/As in the public sector have a full-time Focal Person for HIV/AIDS, 23 agencies now have workplace programmes in place; 22 agencies have a HIV/AIDS sectoral committee as per MTP III guidelines and 17 agencies have a sector policy in place (OPM 2009).

With support of UNDP, the OPM further supervised an impact study on HIV/AIDS in the public sector. The study applied actuarial methods to model the impact of HIV/AIDS on staff in all ministries, thereby providing predictions about future impacts of HIV/AIDS (until 2015) within broad plausibility bounds. Partially in relation to these plausibility bounds, the findings of this study have not been made public yet. Since the publication of the report has been delayed, some of the data that the study referred to have become nearly outdated. Moreover, the potential added value of the report has been diminished, as the recommendations of the study have not been made available to feed into the MTP IV, which is currently being formulated.

A challenge in the mainstreaming efforts in the public sector is that many Focal Persons have other responsibilities in addition to their mainstreaming activities, whereas the implementation of workplace programs requires adequate attention due to the nature of the
activities involved. Tact and balancing from various actors in an agency are required to prevent stigma and discrimination: management, the HIV-committee, OPM’s HIV-division, funding entities, service providers and the beneficiaries of the Public Service workplace programmes in this regard need to cooperate. This implies that the management of government agencies needs to provide sufficient leadership and support to the Focal Persons in sectors, but it is not always given. As a result there is a fairly high degree of turnover of Focal Persons who have been recently trained, leading to a loss of capacity and skills.

These challenges underscore that HIV/AIDS programs in most sectors need to grow to realise more profound impacts. Overall, it is however clear that mainstreaming of HIV/AIDS in the public sector has commenced and that the mainstreaming landscape is gradually changing.

5.2.3 Mainstreaming HIV/AIDS in the agricultural and environment sector

With support of GTZ and DED mainstreaming efforts in the agricultural and environment sectors have been undertaken since 2006, specifically targeting the Ministry of Agriculture, Water and Forestry (MAWF), the Ministry of Lands and Resettlement (MLR) and the Ministry of Environment and Tourism (MET). The efforts in these ministries comprise both the internal and external mainstreaming of HIV/AIDS. Internal mainstreaming efforts deal with the introduction of workplace policies and programmes, which address HIV/AIDS in the own organisation. External mainstreaming concerns the question how HIV/AIDS affects the services and mandate of the organisation and what this means for the client population and target groups of a ministry or other organisation. Vice versa the question should be asked, to what extent the manner in which services are delivered by agencies, influences the spread of the HIV/AIDS epidemic (MAWF 2008).

The mainstreaming activities of MAWF comprised various workshops for selected directories with the support of the GTZ/DED project, initially with a focus on workplace programmes and training peer educators of the ministry across the country. External mainstreaming activities concerned training on the impact of HIV/AIDS on the services of various directorates of the ministry. In addition, so-called “Positive Living” trainings were organised for staff members of MAWF as well as communities, whereby the participants were introduced to gardening methods, balanced diets and other nutritional aspects to improve food security of PLWHA.

The MET has re-drafted an HIV/AIDS policy for the ministry, which is currently being reviewed (MET 2009). In addition the MET and MLR have carried out regional trainings for peer educators across the country, together with the MAWF. To this effect the three ministries, with support staff of GTZ and DED, teamed up with NACSO, as this organisation had gained expertise with mainstreaming of HIV/AIDS in CBNRM support organisations since 2003 (NACSO 2009). With the assistance of NACSO the three ministries trained 428 peer educators in the first round, whilst another 283 peer educators attended refresher trainings between March 2007 and September 2008. The peer educator trainings dealt with disseminating HIV/AIDS related information to staff in the ministries, promoting access to
VCT, awareness raising about treatment, care and support services and finally with the reduction of stigma and discrimination in the workplace. The focus was mostly on educating colleagues in the own organisation. Where possible peer educators were expected to educate community based organizations. The ratio of peer educators trained to staff working for MET was about one peer educator for ten staff in the organization. For MAWF it was 1 peer educator for 15 staff and for MLR it was 1 peer educator for 9 staff (NACSO 2009).

A review report of NACSO indicated that in the three ministries relatively more staff from lower ranks were trained as peer educators, whilst few members of mid-level management staff and no upper management cadre were trained. The report further underscores that the fact that no support system and reporting mechanism has been put in place for the peer educators in the three ministries, had a significant implications for the sustainability of the peer educator program within these ministries (NACSO 2009). Stakeholders in this regard underscored that a lot depends on the personal motivation of focal persons and peer educators in the organisation, as there is no consistent monitoring of the efforts of peer educators.

Nevertheless there are also some impressions that more mainstreaming has happened in recent years than comes to the eye. It appears that extension workers have e.g. been trained in identifying vulnerable households as potential beneficiaries for Draught Animal Power training, as this is a labour saving technique. Although such efforts are integrated in the practices of the Department of Engineering and Extension Services, they are necessarily recognised as the mainstreaming of HIV/AIDS.

5.2.4 Mainstreaming HIV/AIDS in CBNRM organisations

In line with the call of MTP III to mainstream HIV/AIDS in organisations and programmes, NACSO developed a program to integrate HIV/AIDS concerns and activities into the day to day work of CBNRM support organizations and conservancies. NACSO recognized at an early stage that member organizations are highly relevant to minimize the social, economic and environmental consequences of HIV/AIDS on employees in their organisations and on the communities with which they work. Since the CBNRM organizations are in contact with communities they are in a position to address factors that make people vulnerable to HIV and to reduce the impact of HIV/AIDS on communities. NACSO’s activities in the field of mainstreaming HIV/AIDS in the period 2003-2007 comprised the following (NACSO 2009):

- Capacity building of NACSO staff and of key management staff of member organizations, including the development of policy guidelines concerning HIV/AIDS that served as a ‘model’ for member agencies to develop their own policies.

- Training of focal persons in member organizations, establishment of a NACSO Working Group on HIV/AIDS and the introduction of workplace policies and programmes in member organizations. The implementation of the programmes was monitored through annual NGO assessments.

- Roll out of HIV/AIDS mainstreaming activities to communities and conservancies through a peer educator programme. In total 383 peer educators in CBNRM organizations and conservancies were trained. In addition HIV/AIDS policies have been formulated by
19 conservancies in 5 regions. Such policies deal with minimizing discrimination of PLWHA, promotion of VCT, rendering support to PLWHA, OVCs and households affected by HIV/AIDS, organizing HIV/AIDS committees and establishing income generating activities for PLWHA.

- Apart from the peer educator programme, HIV/AIDS was mainstreamed in the conservancies by means of training conservancy management committees, conservancy staff and specific CBNRM support groups, such as groups that support craft enterprises and campsite staff. These target groups have all been trained to integrate HIV/AIDS prevention and support into their regular duties.

- A Monitoring, Evaluation and Reporting (MER) system in support of the peer educators has been established, which allows for quarterly reporting to NACSO. It also provides opportunity for further support to peer educators.

Since late 2008 the NACSO strategy no longer merely deals with training peer educators in fields described above, but also now involves a stronger focus on limiting further HIV infections. This implies a stronger focus on Behaviour Change Communication (BCC). BCC goes beyond basic prevention messages on ABC that are usually part of the peer educator trainings. Thus BCC involves practical communication strategies which will engage people to more actively debate with their peers the outcomes of high risk behaviours. It is assumed that having more frequent dialogues among peers is a more effective strategy to understand why behaviour change is necessary, as the element of social control from peers constitutes a supporting factor.

5.2.5 Progress and challenges in mainstreaming HIV/AIDS in the environment and agricultural sector

The review by NACSO (2009) underscores substantial progress has been made with mainstreaming HIV/AIDS in CBNRM organisations and that a start has been made in several ministries (MET, MLR and MAWF). NACSO’s analysis of 10 conservancy HIV/AIDS policies revealed a commitment to mainstreaming HIV/AIDS, with a focus on information dissemination and awareness raising in communities around the major themes of MTP III, i.e. to create non-discriminatory working environments and to fight stigma, discrimination and traditional beliefs. Further efforts consisted of promoting VCT and maintaining confidentiality, as well rendering support to OVC and AIDS-affected households. Support groups and self-sustainable projects for PLWHA have been established in 4 out of 10 of the conservancies analysed. Transportation is in some conservancies provided to PLWHA to collect ARVs. Overall, collaboration with partner organisations in the field of HIV/AIDS has been realised, whilst HIV/AIDS committees have been established in a number of conservancies.

As a result of these policies and the activities of peer educators there is qualitative evidence of increasing numbers of people know their status, while stigma and discrimination have been reduced to a certain extent. There is also increasing involvement of community leaders in awareness raising activities. Peer educators have established awareness raising corners in
conservancies, NGOs and ministries, where condoms are also regularly supplied. Reportedly there is an increase in the demand for condoms, as well as femidoms. Information and education programs are relatively well-attended and people tend to request for more information and feedback after such events. Peer educators have also started supporting AIDS awareness clubs in schools, while HIV/AIDS forums have been established in six conservancies in the Caprivi.

It should be noted at this stage that the policies and activities of the peer educators are characterised by a focus on internal mainstreaming. As in workplace programmes in other organisations, the main focus is on information sharing, awareness raising, condom distribution and reducing stigma and discrimination. Efforts in external mainstreaming, i.e. dealing with the question how HIV/AIDS affects the beneficiary population and the activities of the CBNRM organisations, are more limited. As mentioned above, only a proportion of conservancies e.g. focused on supporting the lives and livelihoods of PLWHA by organising self-sustainability projects. It is furthermore noteworthy that the NACSO review underlined that so far hardly any of the HIV/AIDS policies in the conservancies included objectives to monitor the impact of HIV/AIDS in terms of a decline in the capacity to manage natural resources. In fact only two out of ten policies reviewed, mentioned the impact on natural resources (NACSO 2009).

The NACSO review further underscored that efforts to mainstream HIV/AIDS, to the extent that the negative impact of HIV/AIDS on the environment is mitigated, are faced with many challenges, which can be summarised as follows:

- The commitment and/or attitude of higher cadre towards mainstreaming HIV/AIDS in some NGOs and ministries reportedly remains a barrier, either because the managers themselves have not been sufficiently trained or because of time constraints. In addition, there are impressions that due to a primary focus on conservation some managers do not fully understand the linkages between human health and environmental management, or – in other words- how HIV/AIDS relates to their mandate and daily work. As a result the need to document and respond to impacts on natural resources resulting from the loss of workers, beneficiaries and skills is not immediately recognized. As such, mainstreaming of HIV/AIDS through CBNRM-programmes does not always get the priority it needs and often little progress is made unless the NACSO secretariat provides regular and consistent inputs.

- Formulating an HIV/AIDS policy for the organisation does not necessarily mean that the policy is implemented, or that staff members are fully familiar with the content of the document.

- Mainstreaming HIV/AIDS by means of training peer educators encounters a number of constraints. In ministries peer educators are often relatively junior staff members, while a substantial proportion of peer educators in NGOs are volunteers. Specific selection criteria for peer educators are not always in place, and as such commitment is not always guaranteed. Neither can it be expected that junior staff educate senior staff in organisations on matters related to HIV/AIDS. Where volunteers are involved, the absence of proper incentives impedes their work and activities. Given these limitations
the turnover of peer educators (and focal persons) is relatively high, which leads to loss of newly acquired institutional knowledge on HIV/AIDS. This is compounded by the absence of proper support and monitoring systems for peer educators in the three ministries.

- Persons with a background in CBNRM and environmental management do not always have sufficient knowledge of social, cultural and biological aspects of the matters related to HIV/AIDS to be able to work on behaviour change communication in their organisations, in parks or in conservancies. Peer educators are faced with issues of gender inequity, traditional cultural norms, religious beliefs, taboos and stigma, as well as misconceptions and misinformation amongst beneficiaries. This further means that communicating ABC as a means to address the impact of HIV/AIDS is not sufficient; advanced communication, facilitation and negotiation skills are at times required by peer educators. All of this implies that continued education of peer educators is required, not only in order to keep them abreast of recent developments in knowledge regarding HIV/AIDS, but also to provide them with the skills to ensure a positive impact of behaviour change communication. Most of these tasks go beyond the core business of organisations.

- To ensure that employees and peer educators have access to adequate support services requires a shift in focus in organisations, from just providing information and condoms to facilitating continuous training and providing access to services and social support structures. This involves more complex challenges including issues of confidentiality, and -in remote areas- logistical challenges (see also the following bullet point).

- The remoteness of parks and conservancies limits access to HIV/AIDS services such as VCT, PMTCT and ART. Condoms and femidoms are also more difficult to obtain, whereas information, reports and guidelines on HIV/AIDS cannot easily reach staff and volunteers in remote areas, since such information is usually only distributed in the more urban areas. Moreover, where stigma and discrimination prevail (as can often be the case in remote areas) questions arise about the most appropriate strategies for dealing with HIV/AIDS in communities. Certain NGOs would e.g. no longer recommend sending people for testing, as they may not be able to get counselling services when they have tested positive, due to the distance and transport costs involved. Furthermore, in remote settings peer educators may find themselves in the role of counsellor or advisor, whereas they are trained to refer infected and affected individuals to professional counsellors.

- The impact of the work of peer educators is not easy to measure. Progress in reducing the HIV-infection rate amongst target groups cannot be properly captured, as there is a lack of local data on the HIV-incidence. Similarly, regional statistics about HIV prevalence are inadequate to measure the results of the work of peer educators.

- According to the NACSO review the ministerial efforts to train peer educators were not well integrated into institutional development processes that supported the HIV/AIDS mainstreaming process in the three ministries. By 2008, none of the ministries had a well established HIV/AIDS unit or program, although policies were in the process of formulation, nor was there a lot of active support at political and senior management levels. This reportedly made it more difficult for lower level cadre to accept the concept
of mainstreaming. Moreover, many of the ministerial trainees were in relatively junior positions and not able to communicate what they learnt with more senior staff. In the absence of proper selection criteria for the trainees, their willingness to function as peer educators was questioned by the NACSO review, all the more since some of the peer educators were not available for refresher training. Finally, the peer educators that were trained in the ministries lacked proper reporting channels and monitoring mechanisms; as a consequence the impact of their work is not known.

5.3 Impact of HIV/AIDS in Namibia

Having discussed the multi-sectoral approach to mainstreaming HIV/AIDS in the previous sections, it is opportune to pay attention to the impact of HIV/AIDS in Namibia. As such attention is first focused on the more obvious direct impacts in terms of demographic and health aspects, followed by impacts on human poverty and orphans and vulnerable children. This is followed by some information on the economic ramifications of HIV/AIDS. Thereafter attention is paid to the impacts of HIV/AIDS that have a relation to climate change, i.e. the impacts on the food security and rural development. Finally the discussion moves on to the impact of HIV/AIDS in the health sector, as this is another sector that may be influenced by both the impacts of climate change and HIV/AIDS.

5.3.1 Demographic and health impact

The HIV/AIDS pandemic has had substantial impacts on demographic factors in Namibia, in particular on mortality and life expectancy. In fact recent trends with regard to mortality in Namibia have caused a reversal of improvements in the health status of the Namibian population.

The first signs that HIV/AIDS had a substantial impact on the Namibian population were provided by the 2001 Population and Housing Census. In the 3-year period before the 2001 Population and Housing Census (1998 to 2001) the number of reported deaths increased from 22,885 to 37,592 cases. This constituted an increase of 80 percent during the three year period. Moreover, 16 percent of all households experienced a death in the 3 year period before the census (NPC 2003). Although these numbers could not directly be related to AIDS, they provided an indication of the impact of the pandemic on the population in the late 1990s. Such impacts were furthermore underscored by the data on life expectancy at birth. Between 1991 and 2001 the life expectancy at birth for women diminished from 62.8 to 50.2 years. For men the life expectancy at birth deteriorated from 59.1 to 47.6 years over the same period (NPC 2003).

The reductions in life expectancy at birth in the inter-censal period (1991 – 2001) coincide with changes in child, maternal and overall mortality levels in Namibia in more recent years, and it is generally agreed that they are also associated to the high HIV prevalence amongst the Namibian population. The 2nd MDG report and the 2006/07 Namibia Demographic and Health Survey underscored that both the infant mortality and under-five mortality rates increased between 2000 and 2006. The infant mortality rate rose from 38 to 46 deaths per
The observed increase in child mortality can only partially be explained by HIV/AIDS, as there are many diseases that children can die off, such as diarrhoea, pneumonia and malaria. Moreover prevailing levels of poverty and malnutrition are generally seen as underlying factors of child morbidity and child mortality, as they have a long term effect on child health. Malnutrition in infants and children can however be compounded by HIV/AIDS. According to the 2006/07 NDHS 7% of children suffered from acute malnutrition in the form of wasting and 20% of children in Namibia were at the time underweight (NDHS 2008; NPC 2009). Behind such statistics lies a reality in which HIV-positive mothers stand for the choice whether or not to breastfeed their children, with potentially far reaching consequences. Whereas breastfeeding used to be considered positive in connection to reducing the risk of malnutrition, it is now associated with an increased risk of transferring HIV-infection to newborn babies (NPC 2009; MHSS 2008d).

The increase in maternal mortality ratios in Namibia is according to the most recent MDG report indirectly related to the high HIV-prevalence rate amongst pregnant women, as 50% of maternal deaths are caused by the disease (NPC 2009). Whereas HIV/AIDS is considered as the principal indirect or underlying cause of maternal mortality, a primary factor of maternal death is the rather limited capacity of health facilities to provide emergency obstetric care, which is of critical importance in saving the lives of women in case of complications during child birth. In the absence of adequate emergency obstetric care in the country, the main direct causes of maternal mortality are hemorrhage, eclampsia, obstructed labour, and sepsis (NPC 2009; MHSS 2008d). Underlining the impact of HIV/AIDS on maternal mortality is the fact that the increase in maternal mortality ratio has occurred even though coverage of reproductive health care, such as antenatal and post-natal care have improved. Antenatal care amongst women who gave birth in the five year period before the NDHS had e.g. increased to 95 percent in 2006. Similarly, in 2006, 65% of women who delivered a baby received a postnatal check-up within 2 days of delivery. In addition, there was a notable increase in the proportion of deliveries attended by skilled personnel between 1992 (68 percent) and 2006 (81 percent) (NDHS 2008; NPC 2009).

Although data on life expectancy, child and maternal mortality provide relevant insights in the impact of HIV/AIDS on human health and Namibian demography, the direct impact of HIV/AIDS on mortality is more difficult to assess, as AIDS is not always registered as the cause of death. As such the nation relies on modelled calculations of MHSS. These calculations indicate that AIDS-related death has reduced in the last five years; while 9,200 persons in 2003/04 had died of AIDS-related causes, in 2007/08 this figure had come down to 5,400 cases. The reduction of AIDS related death during the last five years is attributed to the successful roll out of ARV treatment in recent years (MHSS 2008b).
The mortality rates described above have implications for the demographic composition of the population as AIDS-related mortality has different impacts on women and men. Women tend to die of HIV/AIDS in the 20-35 age bracket, whilst men tend to die later, in the 30-45 age bracket. By 2030 this will have repercussions for the balance between men and women in each of the 5-year age brackets in the population aged 15-44 years of age; overall there will be less women than men (MHSS 2007a).

5.3.2 Other health impacts: co-infection with TB

As HIV reduces the immunity of individuals, co-infection with TB is a risk for HIV-positive individuals. Whereas, tuberculosis is generally related to situations of poverty and malnutrition, overcrowded living conditions and alcoholism, the incidence of TB in Namibia is fuelled by the HIV/AIDS pandemic. This is underscored by the fact that, Namibia ranks second in the world in terms of the incidence of tuberculosis, although improvements have been made in recent years (NPC 2009).

In 2006 Namibia registered 765 TB cases per 100,000 persons, which is an improvement as compared to 2004, when 822 cases were reported per 100,000 persons. As the TB treatment requires taking daily medication for a period up to 18 months, there is substantial risk of non-compliance and failure of treatment as a result. Between 2004 and 2006 the proportion of TB cases treated successfully had improved from 70% to 76% (NPC 2009). According to Namibia’s MDG report these improvements are due to enhanced efforts in the prevention and treatment of tuberculosis, in particular efforts with Directly Observed Treatment Support (DOTS).

5.3.3 Impact on human development and poverty

Given the trends in mortality and life expectancy since the early 1990s described in the previous sections, UNDP Namibia is of the opinion that the HIV/AIDS pandemic is the principle cause for the change in the status of human development and human poverty in Namibia between 1991 and 2001. During this period the Human Poverty Index (HPI) of Namibia increased from 29 to 34 percent. This was mostly due to the deterioration in the first out of four components of the index, i.e. the probability of not surviving to the age of 40 years. Whereas in 1991 only 18 percent of the population was not likely to survive the age of 40, by 2001 this was applicable to 42 percent of Namibians and this was clearly associated to the HIV prevalence (UNDP 2007).

5.3.4 Impact on orphans and vulnerable children

The HIV/AIDS pandemic has contributed to considerable changes in the demographic composition of the household population in Namibia over the last two decades and has had major implications for the number of orphans in Namibia. According to the 2001 Population and Housing Census 24% of all households had at least one child that had lost one parent and 3% of households had at least one child that had lost both parents. This translated in 12% of
According to the 2006/07 Namibia Demographic and Health Survey a total of 17 percent of Namibian children under the age of 18 were classified as orphans and 14% as vulnerable children (OVCs). The two categories together represented 28 percent of all children in Namibia.

Substantial regional differences in the proportion of orphans and vulnerable children amongst children under the age of 18 can be observed. In fact the proportion of orphans and vulnerable children varied between 31% and 37% in all north-central regions (Omusati, Oshana, Ohangwena, Oshikoto) and Kavango, and even amounted to 42% in the Caprivi region. Apart from Karas where OVCs comprised 26% of all children under 18, in all other regions the proportion of OVCs ranged between 18 and 21 percent (NDHS 2008; see Figure 5-8).

Figure 5-8: Proportion of OVCs by region. Source: NDHS 2006/07.

Generally, the social and economic situation of orphans and vulnerable children (OVCs) is different from non-OVCs. Although the OVC status does not appear to influence patterns of
school attendance, the OVC status does matter in terms of meeting basic material needs (defined as having a pair of shoes, two sets of clothes and a blanket). Whereas 50 percent of all children aged 5-17 could meet their basic material needs in 2006/07, only 41 percent of OVCs had such basic needs met. Orphans and vulnerable children are also worse of in terms of food security and nutrition; whilst in general 20% of children in Namibia are underweight, 27% of OVCs are underweight. Moreover, there are signs that female OVCs are more likely to have sex before the age of 15 than non-OVCs (NDHS 2008).

5.3.5 Economic and political impact

Although there is not a large amount of empirical evidence, economists generally agree that HIV/AIDS has a negative effect on total GDP growth, as the pandemic slows down population growth. As a consequence of the increase in mortality and the reduction of life expectancy, economic output is expected to be adversely affected, and this is compounded by reductions in productivity, due to morbidity and the shortage of skilled labour. Increasing health expenditure and expenditure for funerals are moreover expected to lead to a decrease of disposable income at household level with roll on effects in terms of economic growth. Referring to studies of United Nations Commission on HIV/AIDS and Governance in Africa (CHGA) the MHSS (2007a) states that in countries where the HIV-prevalence is 10 percent or more, national economies could be 18 percent smaller by 2030, unless stronger political commitment to address the pandemic will be observed in the meantime. At the same time, between 1990 and 2000, national income may already have declined at a rate of 1.7 percent per year. Such economic impacts would have serious implications for the overall capacity of the state to deal effectively with national emergencies, while it will likely increase political instability (MHSS 2007a).

Whereas there is some agreement on the impact of HIV/AIDS on the overall GDP growth, there is some disagreement on the impact of HIV/AIDS on GDP per capita, mostly due to paucity of data (Haacker 2009). The author finds that in Southern African countries with a HIV-prevalence rate of 15–35 percent, HIV/AIDS is associated with a decline in per capita GDP growth of less than 1 percentage point. This would imply that the impact of HIV/AIDS on per capita GDP itself in most countries would be very small. In earlier work Haacker (2002) however provided slightly higher estimates of the change in output per capita due to the HIV/AIDS epidemic, based on assumptions for an ‘open economy model’\(^1\). His modelling efforts substantiated that in the medium term (10 to 15 years) the decline in per capita GDP could range from 4 to 10 percent in Southern African countries. The effect in the long term (towards 2050) was much smaller. For Namibia the decline in GDP per capita in the medium

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\(^1\) Haacker (2002) states that in his ‘closed economy model’ the savings rate (and thus investment) only changes as resources are re-allocated to the health sector, or as households affected by HIV/AIDS reduce their savings. This model has limitations, as the savings behaviour is difficult to quantify. The ‘open economy model’ addresses some of the shortcoming involved, by linking the rate of return of domestic assets to interest rates.
term was estimated to amount to 5.8 percent, whilst the decline in the long term would amount to 1.8 percent (see Table 5-3).

Table 5-3: Impact of HIV/AIDS on per capita income, open economy, medium and long term (Haacker 2002).

5.3.6 Impact on food security, skills and rural development

There is general consensus that HIV/AIDS has a major impact on food security, agricultural and rural development as substantial amounts of agricultural labour are lost. Estimates of loss of agricultural labour for Southern Africa for the period 1985-2020 range from 20 to 26 percent, where Namibia with 26% scores top of the list of labour loss (FAO 2002 in MHSS 2007). The UN system in Namibia (2004) has referred to the impact of HIV/AIDS on human development in Southern Africa as the “Triple Threat” which represents a set of complex relations between the HIV/AIDS epidemic, poverty, deepening food insecurity and a hollowing out of capacities at the national, community and household levels. The interaction of the HIV/AIDS pandemic with the other factors has changed the nature of crises in
Southern Africa. Instead of short re-current disasters, rural areas are now faced with a chronic ‘long-wave’ crisis (Wiggins and Maunder 2006; UNDP 2004a; Standing 2005).

UNDP (2004) reasoned that in a conventional crisis the steady process of human development (1a) could be interrupted by an external shock, such as a drought or a flood (2a). Under normal conditions affected communities and households would recover again when better conditions return (3a), and after some time there would be a return to the pre-crisis path of sustained progress towards improved human development (4a). The net result of the crisis would thus be a temporary delay in development. This “normal” development path in Southern African countries is, however, heavily affected after nearly three decades of the HIV/AIDS epidemic in Southern Africa, because the capacities of households and governments to manage the crisis and drive the development process have been critically weakened.

In current ‘Triple Threat’ situation with HIV/AIDS, the process of sustained human development (1b) can again be interrupted by the external shock (2b) as in the original situation. The floods and droughts in 2007, 2008 and 2009 in Namibia are a case in point. But instead of a return to recovery, AIDS related mortality has a major impact on families, communities, and institutions, which ultimately affects the capacity to respond effectively. This ultimately leads to increased food insecurity and poverty and increased vulnerability (3a).

Referring to Southern Africa Wiggins and Maunder (2006) outline how the Triple Threat affected farmers at the beginning of the 21st century. Harvest failures in 2001 and 2002, and then again in 2005 resulted in a loss of (real) incomes to farmers, and generally all farmers were faced with rising costs of food staples. For the poor, staple food price rises of two times or more meant considerable hardship, with negative impacts on food intake. The temporary problem of harvest failures appeared hard to overcome due to chronic conditions of poverty and food insecurity that according to the authors affected 40% or more of the population in Southern Africa (Wiggins and Maunder 2006). The authors continued to argue that HIV/AIDS had exacerbated that situation, as labour and capital were lost to diseases and death, resulting in a decreased capacity to deal with the short term shocks (i.e. the failed
harvests). Livestock had also died due to the drought or had been sold off to address needs brought about by the effect of short term droughts and HIV/AIDS.

These processes are also substantiated by a FAO-study (2003a) for Northern Namibia, which underscored that the HIV/AIDS epidemic not only affected the availability of labour in rural households, but caused a loss of farming knowledge which negatively influenced the uptake of improved farming practices. This resulted in a reduction of the area under cultivation, declining crop productivity, yields and hunger; in fact 43% of all households reported having suffered from hunger in the month prior to the study, but the proportion of widow-affected and orphan-headed households that suffered was considerably larger (Figure 5-9).

![Figure 5-9: Food security status of widow-affected, orphan-headed and male-headed households in Northern Namibia 2001 (FAO 2003a).](image)

FOA (2003a) further noted that a substantial number of livestock were lost amongst all types of households between 1996 and 2001, amongst others due to recurrent droughts. However, HIV-affected households reportedly suffered more often from livestock losses than the unaffected households; whereas over 70% of affected households reported cattle losses, this applied to ‘only’ 60% of non-affected households. Widow-affected (89%) and orphan-fostering households (71%) again were relatively more often affected by such asset losses. As such HIV-affected household were experiencing increasingly difficult conditions during this five-year period (1996 – 2001), with the loss of productive household labour and increasing costs resulting in the distress sale of livestock, particularly cattle, to cover expenses. In terms of coping strategies FAO (2003a) observed an increased interest in off-farm income generating activities. Gender roles were also changing as women are forced to look after the sick and undertake productive activities that they did not used to be involved in. Due to the burden of care amongst women, children had become more involved in productive activities as well. The complex of factors ultimately affected household food security and resulted in loss of assets and skills and increasing dependence on other households and families.

It should be noted however that the impact of the pandemic goes well beyond the impact on agricultural output per sé, since the whole social fabric and the reproductive capacity in rural
areas is affected. For, those who are dying are not merely agricultural workers but more importantly, household heads, mothers and fathers of children or adolescents, who operate as caretakers, share livelihood knowledge and skills and maintain social networks and safety nets (MHSS 2007a). With their disappearance from families and communities, vital knowledge, skills, norms and values are at risk of not being sufficiently reproduced to sustain livelihoods and communities in rural areas.

Fuller and Van Zyl (2006) provided further quantitative background to the HIV-impact on the livelihoods of small-scale farmers in northern Namibia and make reference to collapsing farm household systems. Over 90% of the households they studied were in a “severe crisis” or a “crisis situation” due to the epidemic, as they could no longer produce any food, whilst the majority of these household hardly owned cattle that could be used to ameliorate the crisis\(^2\). The final 6% of the households studied were also “close to collapsing”\(^3\). Fuller and Van Zyl (2006) concluded that a silent famine has occurred in Namibia’s northern regions. Unlike a normal famine, with HIV it is not whole communities that are affected. The crisis hits individual households, making it almost invisible. Only those who are affected feel the hunger. As such it is a famine that is invisible.

5.3.7 Impact on natural resource management / CBNRM

There appears to be some consensus in the environmental sector that AIDS-related morbidity and mortality have an impact on the management of natural resources (Dwasi 2002; IECN 2005; NACSO 2009). CBNRM support organizations, conservancies and parks report that they are losing personnel, knowledge and skills through HIV/AIDS related sickness and death and that absenteeism and psychological stress affect productivity on the work floor. In a study on perceptions of the HIV impact on organisation, held amongst staff in various environmental agencies, 63% of respondents reported that they had experienced vacancies in their organisations due to the HIV/AIDS epidemic (IECN 2005). Consequently there is concern that the efforts and investments made in CBNRM support services and in environmental management over the last decade might be lost. Most of the impacts described below are however of qualitative or anecdotal nature, rather than being supported by quantitative data. NACSO (2009) in this regard admits that the extent to which the impacts are actually felt is difficult to assess. As such, the HIV-environment linkages that are presented below are possibly more of a predictive impact. The impacts can be summarised as follows:

\(^2\) In fact only one quarter of the “severe crisis” households (78% of the sample) owned some cattle (with half of the cattle owners having less than 11), whilst near to 40 percent owned some goats. The second category of households (16%) was in a “crisis situation”, but were capable of producing between 750 and 1500 kg of grains, and all of these farm households had remained with some cattle (although 50% of the households had less than 12 head of cattle).

\(^3\) The “close to collapsing” farmers were capable of producing more than 1500 kg of grains and all households owned cattle and goats.
Ill health may directly influence conservancy activities, as work in the CBNRM sector often requires physical strength and endurance, as well as leadership. Absenteeism is expected to have a negative effect on the capacity to manage natural resources, as energy, time and money are needed for looking after family members and for funerals. Reportedly the use of vehicles in conservancies and parks is also affected. This may altogether result in a slowing down of CBNRM and/or park management activities, with repercussions for the benefits that could otherwise be derived from such work. Capacity building and empowerment of rural communities appear to be particularly influenced, ultimately delaying or disturbing the sustainable management of natural resources (NACSO 2009; IECN 2005).

In relation to resource management, concerns have been expressed that reduction in household and conservancy labour could lead to either underutilization or over-utilization of resources, as well as illegal use. Poaching and uncontrolled use of plant resources could increase if there are insufficient game guards or resource monitors. Similarly, pressure on veldt resources could increase, because HIV-affected households are reportedly more reliant on veldt foods such as nuts and fruits than households that are not affected by the virus (IECN 2005; NACSO 2009). In relation to the capacity to control it is illustrative that Dwasi (2002) reported that it had become more difficult to patrol conservancy areas in the Caprivi with reduced numbers of staff. The matter was compounded by increasing wildlife numbers and concerns of villagers over the management of problem animals.

Professional capacity in various fields may be lost, including leadership and management skills, networking skills, community liaison and mobilization skills, as well as specific conservation skills (e.g. game capture, event book system, tracking, harvesting methods, water point management and protection from elephant damage). In general institutional memory is affected (NACSO 2009).

Loss of traditional knowledge and skills. When adults in the productive ages (25-49) die traditional knowledge of natural resource management and local farming systems is often lost, and land and resources are used in less appropriate ways, a matter that was substantiated by the findings of FAO (2003a) in northern Namibia (see also section 5.3.6). This implies a risk of failing to adapt to changing circumstances. For example, sustainable grazing practices might be lost leading to the risk of overgrazing or desertification (IECN 2005; NACSO 2009).

Staff of CBNRM organizations raised concerns about the potential loss of opportunities for projects and partnerships to harvest benefits of nature conservation, as critical capacities such as negotiation skills might be lost. This could ultimately result in a reduction of income and other benefit from tourism and wildlife management. Hard evidence of this was however not available (NACSO 2009).

Apart from these impacts of HIV/AIDS on CBRNRM staff and on the environment, in return, the CBNRM program may have increased the risk of HIV infection in conservancies, as development is brought to people in remote areas of the country (NACO 2009). Due to CBNRM intervention more income is available in the conservancies, whilst – given the
nature of the work involved – highly mobile CBNRM staff regularly move in and out of the conservancy areas. Similarly, increased incomes in conservancies have contributed to mobility of beneficiaries and to higher levels of alcohol consumption. This combination of factors increases the exposure of CBNRM beneficiaries to HIV-infection.

5.3.8 Impact on the health sector

This section deals with the impact of HIV/AIDS on health systems and on the health workforce. It is generally accepted amongst scholars that HIV/AIDS affects the performance of health systems in Sub-Saharan and Southern Africa (Tawfik and Kinoti 2003; Owen 2004; Cohen 2002; WHO 2006; Dovlo 2005; Herbst et al. 2009). Three aspects are relevant discussing in this regard:

- The impact of HIV/AIDS on the demand for health care services
- The impact of HIV/AIDS mortality and attrition in the health sector
- The impact of HIV/AIDS on the performance of the health workforce / sector

5.3.8.1 HIV/AIDS impact on demand for health care

First of all the HIV/AIDS pandemic has increased the demand for health services related to HIV/AIDS, such as the prevention of mother-to-child transmission (PMTCT) and the provision of new HIV/AIDS therapies including antiretroviral drugs, voluntary counselling and testing services, as well as new forms of home based, palliative and psycho-social support. Moreover, the pandemic has changed the landscape of health and disease as previously fairly well controlled diseases, such as malnutrition, tuberculosis, diarrhoea and other opportunistic infections have resurged as a result of HIV/AIDS. AIDS patients in the prime age group (25-49) tend to use relatively more health services in the period before dying than patients dying of other causes. As such there is an increased burden of disease, which leads to higher demand for treatment services and for hospital beds (Tawfik and Kinoti 2003; Owen 2004).

The growing impact of the tuberculosis (TB) in countries with a high HIV-prevalence rate compounds the situation sketched above. TB has become the leading cause of death among people infected with HIV, accounting for one-third of AIDS deaths worldwide. In addition the World Bank estimates that 25 percent of HIV-negative persons dying of TB would not have been infected with TB in the absence of the AIDS epidemic (Tawfik and Kinoti 2003). Section 5.3.2 presented information on TB-prevalence in Namibia, which indicated that Namibia ranks second in the world in terms of the number of TB cases. Such a scale of TB-infection implies an increase in demand for service providers trained in its management, on top of the demands related to HIV/AIDS.

As the increased need for treatment and care of HIV/AIDS patients is also associated with a longer stay in hospitals, patients seeking treatment for more traditional illnesses risk being crowded out to more peripheral health facilities, thus denying them the right to care. As an example of the crowding out effect, Tawfik and Kinoti (2003) refer to a Nairobi hospital
where the number of admissions of people not infected with HIV decreased by 18 percent between 1998 and 2002. In the same period the number of those who were HIV-positive more than doubled.

The extent to which HIV/AIDS increases demand for health care services is difficult to quantify, as it depends by and large on the interaction between factors such as the death rate in the productive ages (25-49 years), the HIV-prevalence rate in this age group, and the average time of infection to death. The availability of ARV-treatment and third party payment for health care further play a role (Owen 2004).

Apart from increasing demand for health services, it is generally acknowledged that HIV/AIDS affects the quality of health services as the complexity of treatment and care increases. More efforts have for example to be undertaken to maintain appropriate levels of safety in medical procedures, which implies a higher cost for the health care system (Owen 2004). The quality of health care is further influenced, because the epidemic affects the number of health workers in the sector, as well as the performance of the workforce (Tawfik and Kinoti 2003; Owen 2004; WHO 2006; Dovlo 2005). The next sub-sections pay attention to these aspects.

5.3.8.2 HIV/AIDS related mortality and attrition in the health sector

There are not many studies that have quantified the impact of HIV/AIDS on health sector personnel in Southern Africa, and data for Namibia are absent. Cohen (2002) reported that estimates of HIV-infection amongst health personnel in Botswana ranged from 17 to 32% for 1999 and were expected to have increased to the range of 28 to 41% by 2005. A study amongst health workers in four South African provinces found that 15.7% of health workers were living with HIV/AIDS in 2002 (WHO 2006).

As a result of HIV-infection, overall an increase in the attrition of health sector personnel can be observed in Southern Africa during the last few decades. A study from Zambia e.g. underscored that between 20 and 35 percent of different types of health cadre in Lusaka’s hospitals were lost, and the attrition rates amongst midwives, nurses and doctors were all higher than 30 percent (WHO 2006). Although such general attrition rates can not solely be attributed to the impact of HIV/AIDS on health sector staff, as low salaries and migration to Europe, the United Kingdom, Canada and the USA in search of better opportunities also play a role, it is assumed that they in part reflect the impact of HIV/AIDS on the sector.

Other studies provide more detailed insight into the quantitative impact of the pandemic on the health workforce. Dovlo (2005) mentions that mortality rates among female nurses in two hospitals in Zambia rose from 2 per 1000 in 1980–1985 to 26.7 per 1000 in 1989–1991. Mortality rates amongst health workers in Swaziland have been reported to amount to 4.9%, whereas death as a cause of attrition of health workers in Mozambique ranged between 40 and 82% in the period 1999-2003 (WHO 2006).

As the HIV/AIDS Impact Study on the Public Sector in Namibia has not been finalised yet and since a specific impact study for the health sector has so far not been carried out, the
extent of HIV/AIDS related morbidity and mortality on human resources in the Namibian health sector is at this stage difficult to assess. However, some inferences could be made based on World Bank projections (1999) quoted by Tawfik and Kinoti (2003). These projections indicate that a country like Namibia with a 15% adult HIV-prevalence rate can expect to lose between 1.6 and 3.3% of its health care providers from AIDS annually. Such rates of attrition of health personnel would not only put the quality of health services under pressure, but also increase expenditure due to the need to replace staff and to train new employees (Herbst et al. 2009). The World Bank (1999) estimated that the additional costs of a 7% increase in attrition rates, for the health sector would amount to approximately 3.5 percent of health expenditure.

5.3.8.3 Performance of the health workforce / sector

Apart from AIDS-related attrition, the performance of the health sector is affected as a result of absenteeism and disease. Whereas Herbst et al. (2009) note that on average 35 percent of health workers in African countries are absent at any given point in time, Taufik and Kinoti (2003) underline that HIV/AIDS-related absenteeism can consume up to 50% of staff time in the final year of life for health workers with AIDS. In Kenya 34% of absenteeism in the health sector was due to personal illness and 6% due to attending to a sick person, and 14% of absenteeism related to attending funerals (Tawfik and Kinoti 2003). Similar data for Namibian health sector personnel are unfortunately not available.

Moreover, the increasing demands of caring for PLWHA have had negative effects on the morale of health sector personnel, leading to a risk of burn-out. Treatment and care for PLWHA have not only led to an increased workload amongst health workers, but health workers must also cope with the psychological stress of palliative care for dying patients, along with caring for their own sick family and relatives (Tawfik and Kinoti 2003; Owen 2004; WHO 2006). In addition, stigma and discrimination appear to influence the performance of health sector personnel in some countries, as respect for AIDS-patients and caregivers, attention given to patients, and communication between health workers and clients reportedly declined (Herbst et al. 2009).

There is further evidence that the HIV/AIDS pandemic may influence the quality of health care services that are not directly related to the HIV-infection. In a study on health care in 14 Sub-Saharan countries, Case and Paxson (2009) found deterioration in various dimensions of care between 1998 and 2005, i.e. in antenatal care, birth deliveries and rates of immunisation of children. Their findings suggest that pregnant women in regions with relatively higher HIV-prevalence rates are less likely to receive proper antenatal care and less likely to have a trained birth attendant present at delivery. High HIV-prevalence rates also had a significant effect on child immunisation. Since there is no indication that HIV-positive women avoid health services (actually they often demand more services), or that people in high-HIV regions have become poorer and consequently are less likely to frequent health facilities, Case and Paxson conclude that the quality of health care is declining in regions with high prevalence rates. Such declines in quality could be due to a redirection of funds towards
prioritised care of HIV-patients, or perhaps to a reduction in the supply of skilled personnel as a consequence of the pandemic.

Notwithstanding the potential impacts on health care delivery described in the paragraph above, based on a limited number of indicators, the quality of health care in Namibia does not seem to have been affected by a similar decline in the quality of health care. The bed occupancy rate for example hardly seems to have been affected by the HIV/AIDS pandemic. In 2001 the national bed occupancy rate stood at approximately 65%, and in 2006 it was 61% (EIR 2001/02; EIR 2006/07). Moreover, according to the 2006/07 Demographic and Health Survey the proportion of pregnant women aged 15-49 who sought antenatal care from a skilled provider (in the five year period before the survey) had by 2006/07 increased to 95 percent. Similarly, the proportion of deliveries that had taken place in a health facility had increased to 81 percent. Similarly the coverage of immunisation of children aged 12-23 months who are fully vaccinated increased from 65 to 69 percent NDHS 2006/07).

5.4 Progress, constraints and challenges in the response to HIV/AIDS

In order to evaluate whether the stakeholders in various sectors in Namibia have the capacity to respond to current and future challenges that are related to HIV/AIDS, in the context of broader development objectives of poverty reduction, food security and adaptation to climate change, this section considers the following factors:

- The capacity to provide adequate treatment, care and support services
- The capacity to prevent further HIV-infection
- The capacity to retain health workers in Namibia and to fill vacant positions
- The capacity to generate financial resources for the national and health sector response to HIV/AIDS
- The capacity to provide leadership and coordination to the national response

The next sub-sections elaborate the respective topics.

5.4.1 The capacity to provide treatment, care and support

In line with the steady increase of the HIV-prevalence rate that was observed between 1992 and 2002, and the delay between infection and the actual manifestation of AIDS, the demand for HIV/AIDS-related healthcare services in Namibia is still expected to increase in years to come. According to models of MHSS approximately 9,400 women needed PMTCT services in 2007/08 and this number is expected to increase to 10,200 by 2012/13. Overall a total of 69,500 people were in need of ART in March 2008. About 5,900 of these individuals were
children, whilst 63,600 were adults. By March 2013 the number of people needing ART is expected to have increased to 114,500 individuals (MHSS 2008b).

Given the increasing demand, efforts in the Namibian health sector have in recent years focused on increasing the coverage of ART and PMTCT treatment to persons in need of these services. Both PMTCT and ART services have now been extended to 35 hospitals and 153 health centres, out of a total of 335 public health facilities (NPC 2009). As a result of these efforts approximately 50,600 individuals (both adults and children) were receiving ARV-treatment in March 2008, which implies that 73 percent of all people in need were covered. Approximately 94,300 individuals are expected to receive ARV-treatment by 2013. Thus, coverage of ART has improved from only 3% in 2003 to over 70% in 2008, whilst future coverage (in 2013) is projected to be around 80 percent (MHSS 2008b).

As such the Mid-Term Review (MTR) of MTP III (MHSS 2007a) already concluded that the number of people on treatment had exceeded the targets set for 2008 and the overall targets had been adjusted upwards. In general the quality of treatment and care in the communicable disease clinics was considered to be of high standard. However, the MTR noted the following challenges:

- Demand for ART and PMTCT appeared to be constrained by poverty, as poor patients are often excluded from services due to inability to pay transport costs and user fees for services at clinics and hospitals.
- Lack of food was raised as the major reason for discontinuing ARV-treatment, which may have implications for drug resistance.
- Other factors influencing access and use of services are stigma, denial and fear for breach of confidentiality.
- Male involvement in PMTCT remains an important challenge.

5.4.2 The capacity to prevent further HIV-infection

According to the MTR of MTP III (MHSS 2007a) half way through Namibia’s third Medium Term Plan, the epidemic showed hardly any signs of slowing down and as such this was considered a threat to the goal of Vision 2030 to reverse the trend in HIV-infection. In general HIV-prevention efforts reportedly remained piecemeal, as most programmes and services were centralized in urban areas, gender insensitive, and lacked adequate targeting for core groups that fuel the epidemic, such as sex workers and mobile populations, men who have sex with men, and other vulnerable groups. Although the ministry published a document on the drivers of the epidemic in 2008, until that time there was not any strategy for enhancing the understanding of core factors and patterns fuelling the epidemic (MHSS 2007a).

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4 It should be noted that these estimates are based on a modelling exercise with broad plausibility bounds.
According to the MTR the infection rates that prevailed amongst the youth until 2007 are a major reason for concern, as 40% of those infected in 2006 were between 15 and 29, notwithstanding the fact that the major part of behaviour change communication efforts (BCC) target the youth.

Although there is some evidence that in recent years the prevalence amongst the youth aged 15-19 and 20-24 has declined (see section 5.1.1), one may concur with the MTR that a further reduction of prevailing prevalence rates would require major changes in sexual behaviour. This implies that prevention efforts need to get more priority and political commitment. BCC efforts would need to be better targeted at groups that are at risk of infection. Working on behaviour change further requires a better understanding of the factors that constrain behaviour change, including economic circumstances, gender inequities and cultural norms. Even though a start has been made by documenting the drivers of the epidemic in Namibia, more research is needed in these fields.

5.4.3 The capacity to retain health workers and fill vacancies

Due to the steady increase of the HIV-prevalence over the sub-continent, the demand for health workers in Sub-Saharan Africa has increased steadily over the last few decades. A barrier to scaling up the response to HIV/AIDS programmes in many Sub-Saharan countries however is the inadequate supply of health workers. Shortages of appropriate health workers in Sub-Saharan Africa are generally acknowledged (Awases 2007; Clemens & Pettersson 2008; Herbst et al. 2009). As far as Namibia is concerned, the MTR of MTP III speaks of a “massive shortage of health workers” (MHSS 2007a).

The ‘brain drain’ of African health professionals to Europe and the USA is one of the factors that play a role in the so-called health workers crisis in Sub-Saharan Africa: by 2004 e.g. some 5,200 African migrant doctors practised in the USA and another 10,200 in the UK (Awases 2007). Clemens and Pettersson (2006; 2008) provided further evidence of the out-migration of health care personnel (see Table 5-4). Thus, the scaling up of the national response to HIV/AIDS takes place against the backdrop of high international mobility of health sector professionals from Southern Africa.

Namibia is not excluded from the pervasive influence of the out-migration of health professionals, although it seems to be limited to more highly skilled personnel. Clemens and Pettersson (2008) for example reveal that by 2000 approximately 45% of the Namibian physicians and 5% of Namibian professional nurses were working abroad, the majority of them in South Africa. The proportion of Namibian physicians that went abroad is higher than the average share of ‘foreign’ doctors of other Southern African countries that was observed by Clemens and Pettersson, but the proportion of nurses that left Namibia was substantially lower than in surrounding countries (see also Table 5-4). Based on the Essential Indicator Reports of 2001/02 and 2006/07 one may further assume that the out-migration of doctors has continued in Namibia after 2001, as the number of state registered doctors in the five year period declined from 278 to 172. It should be noted however, that there are many medical
professionals in the private sector, especially in Windhoek and Swakopmund, that have not been captured in these statistics.

Due to the limited capacity of developing countries in Southern Africa to train sufficient numbers of health workers, as well as the loss of skilled health workers to other regions and countries in the world, the average number of health workers in Sub-Saharan Africa is much lower than in other countries, with an estimated average of 0.98 health workers per 1,000 of the population. This is far below the global average of 4.0 and the minimum estimated requirement of 2.5 health workers per 1,000 of the population to achieve the MDGs (Herbst et al. 2009). As a result the delivery of health care services over much of especially rural Africa is severely affected (Awases 2007).

Table 5-4: Migration of physicians and nurses from selected countries in Southern Africa around 2000 (Clemens and Pettersson 2006).

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>PHYSICIANS</th>
<th></th>
<th></th>
<th>NURSES</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DOMESTIC</td>
<td>ABROAD</td>
<td>% OF TOTAL</td>
<td>DOMESTIC</td>
<td>ABROAD</td>
<td>% OF TOTAL</td>
</tr>
<tr>
<td>Angola</td>
<td>881</td>
<td>2,102</td>
<td>70</td>
<td>13,135</td>
<td>1,841</td>
<td>12</td>
</tr>
<tr>
<td>Botswana</td>
<td>530</td>
<td>68</td>
<td>11</td>
<td>3,556</td>
<td>30</td>
<td>2</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>1,310</td>
<td>553</td>
<td>30</td>
<td>5,342</td>
<td>1,077</td>
<td>17</td>
</tr>
<tr>
<td>Liberia</td>
<td>73</td>
<td>126</td>
<td>53</td>
<td>185</td>
<td>807</td>
<td>81</td>
</tr>
<tr>
<td>Mozambique</td>
<td>435</td>
<td>1,334</td>
<td>75</td>
<td>3,064</td>
<td>853</td>
<td>19</td>
</tr>
<tr>
<td>South Africa</td>
<td>27,551</td>
<td>7,353</td>
<td>21</td>
<td>90,966</td>
<td>4,844</td>
<td>5</td>
</tr>
<tr>
<td>Swaziland</td>
<td>133</td>
<td>53</td>
<td>28</td>
<td>3,345</td>
<td>36</td>
<td>3</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>1,531</td>
<td>1,602</td>
<td>51</td>
<td>11,840</td>
<td>3,723</td>
<td>24</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
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<td>36,653</td>
<td>28</td>
<td>414,606</td>
<td>53,298</td>
<td>11</td>
</tr>
</tbody>
</table>

Source: Clemens and Pettersson 2006.
Note: "Domestic" health professionals include immigrants. Figures therefore overstate net effects of migration. Data on health professionals abroad include only those identified from nine key receiving countries; they therefore underestimate outward migration.

The situation in Namibia is not very different. The ratio of the population per state doctor (11,754) and the population per state registered nurse in Namibia (1,748) in 2006/075, translate in into the following ratios health workers per 1,000 of the population:

- 0.085 state registered doctors per 1,000 of the population
- 0.862 state registered nurses per 1,000 of the population
- 0.037 state registered pharmacists & dentists per 1,000 of the population
- Total: 0.985 state registered health workers per 1,000 of the population.

The health care worker’s challenge in Namibia is further characterised by a strong reliance on foreign health staff and an imbalance in the distribution of health workers with severe rural shortages (Equinet 2009a). The MTR of MTP III (MHSS 2007a) estimated the shortage to be

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5 Data of the draft 2006/07 Essential Indicator Report and NPC’s Population Projections (2006) were used to carry out the necessary computations.
more than 33 percent of the number of staff that would be needed to reach the MDGs related to health. In relation to this it is further significant to note that the Essential Indicator Reports of MHSS underscore that the number of vacant health sector positions in Namibia has increased from approximately 12% in 2001/02 to 21% in 2006/07 and to 27% in 2008 (EIR 2001/02; EIR 2006/07; Equinet 2009b).

A number of factors may have contributed to this situation:

- Firstly, key informants in the MHSS and the OPM acknowledged that the demographic profile of the MHSS reveals an aging staff structure. Of all agencies in the public sector the MHSS has the highest proportion of staff that entered the office between 1960 and 1980 and the average age of health sector staff is relatively high (approximately 45). As the retirement age for health sector staff lies at 55, this explains why an increasing number of positions have in recent years become vacant. The early retirement age creates a gap that the ministry, in the absence of qualified Namibian candidates, so far has tried to fill by bringing in relatively young foreign nurses. As the influx concerns young women, the risk of HIV-infection amongst health sector personnel could be exacerbated, because young women are more vulnerable to HIV-infection.
- In line with trends for Sub-Saharan Africa, the migration of health sector staff to other countries might have become more prominent in recent years.
- Even though hardly any data are available, it can also not be excluded that HIV/AIDS may have had an increasingly significant impact on the human resources in Namibia’s health sector, leading to attrition of staff.

Whatever the weight of each of these factors, if the trend in vacant positions is not reversed, delivery of health care services may in the future be negatively affected, as the health workers challenge in Namibia will be exacerbated. A decline in the capacity to deliver due to a high number of vacancies would by itself constitute a threat to any response that would be required to address the Millennium Development goals related to health, with potential roll on effects for the MDGs of poverty, hunger and environment.

It should be noted though that the health worker challenge has been acknowledged by the Namibian government and donors. In order to roll out ARV-treatment to rural areas, from 2004 to 2006 the MHSS managed to hire more than 500 HCWs for the ART-programme specifically. This was made possible by funding from a number of international donors and through a partnership with a private sector human resources service provider. As the conditions of service match those of health workers in the civil service, this innovation has been acknowledged as good practice (Equinet 2009a).

5.4.4 The capacity to generate resources for the response to HIV/AIDS

Apart from resources needed for the roll out of PMTCT and ART services per sé, as described in section 5.4.1, the Ministry of Health and Social Services reviewed the financial resources needed for the implementation of all programs and services that are part and parcel of MTP III for the period 2007-2012 (MHSS 2007d). The Resource Need Estimates (RNE)
comprised assumptions for high, medium and low scenarios for the roll-out of MTP III related services and programs. Successful implementation of MTP III was on an annual basis estimated to require N$1.3 billion (US$ 183 million)\(^6\) for the low scenario, whilst the medium and high scenarios required N$ 1.6 billion (US$ 218 million) and N$ 1.9 billion (US$ 270 million) per annum respectively.

The Resource Need Estimate (RNE) of the low scenario was considered insufficient to cover the needs of prevention and treatment services and was therefore discarded. Apart from differences in the total amount of resources required, the major difference between the high and medium scenario related to the proportion of funding that is made available for mitigating the impact of HIV/AIDS. In the high scenario the share of the mitigation component is considerably higher than in the medium scenario, which reserves relatively more resources for treatment (see Table 5-5). This distinction might be relevant to dealing with the future challenges such as climate change, as that would require more resources for impact mitigation.

The estimated resources required for the implementation of MTP III accounted for between 4% and 5% of the GDP in 2005 for the medium and high scenario respectively. This coincided with approximately 12% (medium scenario) and 15% (high scenario) of the total government expenditure in 2005.

Table 5-5: Share of MTP III components for low, medium and high scenarios of resource needs (MHSS 2007d)

<table>
<thead>
<tr>
<th></th>
<th>High Scenario</th>
<th>Medium Scenario</th>
<th>Low Scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevention</td>
<td>24%</td>
<td>26%</td>
<td>29%</td>
</tr>
<tr>
<td>Impact Mitigation</td>
<td>33%</td>
<td>24%</td>
<td>23%</td>
</tr>
<tr>
<td>Treatment</td>
<td>32%</td>
<td>37%</td>
<td>33%</td>
</tr>
<tr>
<td>HR</td>
<td>6%</td>
<td>8%</td>
<td>9%</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Policy, Mgt. Coordination, Monitoring and Evaluation</td>
<td>3%</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

In per capita terms the annual resource needs for implementation of MTP III were estimated to amount to N$744 (104 US$) for the medium and N$918 (129 US$) for the high scenario. The average annual per capita resources needs for implementation of MTP III programmes in the health sector were N$406 (US$ 57) and N$423 (US$ 59) for the medium and high scenarios respectively. Thus, the annual per capita resource needs for addressing HIV/AIDS in the health sector as a percentage of the Total Health Expenditure (THE) ranged from 47% (medium scenario) to 49% (high scenario) (MHSS 2007d).\(^7\)

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\(^6\) The exchange rate that MHSS applied at the time was US$1 = Namibian $7.12550

\(^7\) THE was expressed in 1999/2000 values as more recent NHA-data were not available at the time
The National Health Accounts for 2001/02 – 2006/07 support that the MHSS has been capable of accessing increasing amounts of funding for the health sector. By 2006/07 the total resource envelope for health was N$3.9 billion (US$549 million), up from N$1.8 billion (US$ 261 million) in 2001/02. In per capita terms total health expenditure increased from N$1,013 (US$143) in 2001/02 to N$1,959 (US$276) in 2006/07. Over the five year period this implied an increase in health expenditure as a % of GDP from 6.5 to 8.3 percent; the latter level is the second-highest among countries in the BNLSS (Botswana, Namibia, Lesotho, South Africa, and Swaziland) region, following only South Africa. The doubling of resources over the five year period was made possible by substantial increases in donor funding for health interventions in Namibia, in particular from PEPFAR and the Global Fund (MHSS 2008d). And again in 2007 the Global Fund Round pledged another 114 million to fight AIDS, TB and malaria, whilst PEPFAR committed more than USD 89 million to the country in 2007 (MHSS 2007a).

Figure 5-10: Increase in Total Health Expenditure (THE) between 2001/02 and 2006/07 in N$ million, Namibia (MHSS 2008d).

The increase in donor funding has resulted in a decline in the share of public financing for health from 63 percent in 2001/02 to 44 percent of total health expenditure (THE) in 2006/07, while donor funding increased from 4 to 22 percent of THE. Financing by households also increased from 19 percent to 25 percent of THE. In absolute terms (after accounting for inflation), government financing over the five-year period increased by 1.5-fold, household spending by threefold and donor spending by twelve fold.

Although considerable progress in health financing has been made over the five year period, it fell short of GRN’s commitment to the Abuja declaration, which aims to achieve a 15 percent allocation of state budgets to health by 2015, believed to be necessary for reaching MDG targets. The GRN-investment in health as a percentage of total government spending averaged 12.2 percent over the five-year period, and had even dropped to 11.3 percent in 2006/07.
Moreover, an important shift in the functions and programs that are targeted with these resources has been observed. The proportion of funding that was allocated to public health programs (including HIV/AIDS programs) increased from 3.7 to 14.5 percent over the five year period, mostly to the detriment of the share of the in-patient function, which dropped from 39.5 to 31.8 percent of THE. Moreover, within the public health programs attention has been increasingly focused on prevention and control of communicable diseases (which include the prevention and control of HIV/AIDS), growing from 51 percent in 2001/02 to 97 percent of health sector program spending in 2006/07. At the same time, investment in maternal and child health (MCH) and family planning (FP) programs, as well as non-communicable diseases (NCDs) decreased significantly, from 44 percent to 3 percent for MCH/FP and from 5 percent to 0.5 percent for NCD. This represents a sizeable shift in absolute terms as well (Table 5-6). Spending on communicable disease programs in 2006/07 increased by 15-fold, while MCH/FP program spending was halved, and NCD program spending, which was low in 2001/02, decreased further (by 10 percent) in 2006/07.

Table 5-6: Change in health program funding between 2001/02 and 2006/07, Namibia (MHSS 2008d).

<table>
<thead>
<tr>
<th>Public health program</th>
<th>2001/02 (N$)</th>
<th>2006/07 (N$)</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal and child health, family planning</td>
<td>30,252,180</td>
<td>15,303,792</td>
<td>0.50</td>
</tr>
<tr>
<td>School health</td>
<td>149,457</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Prevention of communicable diseases</td>
<td>35,346,819</td>
<td>544,193,899</td>
<td>15.4</td>
</tr>
<tr>
<td>Prevention of non-communicable diseases</td>
<td>3,239,680</td>
<td>2,838,945</td>
<td>0.87</td>
</tr>
</tbody>
</table>

The MTR of MTP III moreover found that the mobilized funding continues to be provided on an “emergency” basis, targeting interventions that have been identified to produce results quickly (MHSS 2007a). These results are however not always strongly linked to what the country needs in the long-term to achieve sustainable HIV/AIDS programme interventions, but rather to donor needs. As such they often involve bringing in foreign technical assistance, or building parallel systems for delivering ART services, condoms and drugs, as well as a fair amount of information and education campaigns. Scaling up the AIDS response, however, requires additional funding to finance mainly recurrent costs (personnel) and local goods and services.

5.4.5 The capacity to mitigate impacts of HIV/AIDS

The fourth component of MTP III dealt with strengthening capacity in sectors and regions to mitigate the impact of HIV/AIDS on society. The activities that were envisaged comprised training to strengthen the local response in communities, capacity strengthening for support groups of PLWHA, services to orphans and vulnerable children and interventions in the field of poverty reduction, food security, shelter and housing. Overall the MTR of MTP III (MHSS 2007a) concluded that little progress had been booked in this area due to a lack of funding. In
addition the review team noted that the understanding of the impact of HIV/AIDS on poverty, food security and rural development was limited, i.e.:

- Although in 2008 progress was made with understanding the drivers of the epidemic in Namibia, there is limited understanding of factors driving vulnerability and of factors that strengthen resilience of various groups in society. Neither are the distributional effects of the impact of HIV/AIDS on rural societies well understood. These points are underscored by Standing (2005).
- There is insufficient understanding as to what extent technological innovations could provide appropriate solutions to the triple threat crisis.
- It is not clear to what extent provision of ART may be a cost-effective intervention that could mitigate some of the negative impacts of HIV/AIDS in rural areas.

Given these uncertainties and gaps in knowledge one could conclude that more research is needed on the vulnerability of the agricultural and rural sectors to HIV/AIDS, with a focus on addressing issues such as labour scarcity, but also on developing strategies to address or mitigate the precarious situation of the most vulnerable groups.

The results of mainstreaming HIV/AIDS in the environment, agricultural and CBNRM-sectors similarly underscore that it is not easy to mitigate the impact of HIV/AIDS on the livelihoods of people in remote rural areas, even though there is evidence of increased knowledge of HIV/AIDS amongst CBNRM-staff and CBNRM-beneficiaries (NACSO 2009). Yet, it was clear that the efforts in the sector are merely focused on awareness raising about HIV/AIDS, with the aim to reduce discrimination and to provide beneficiaries in conservancies with right information and channels to deal with the disease. In this regard VCT and condom use are promoted, and people who need treatment are assisted in accessing ARV-therapy, when and where this is logistically possible. In relatively few conservancies efforts are made to address the impact of HIV/AIDS on the lives of affected households through support activities for OVCs and PLWHA, and such efforts are not undertaken across the board. Similarly, the number of conservancies in which efforts are made to deal with the negative impact of HIV/AIDS on the management of the environment, is even smaller, even though awareness of the potential effects appeared to be present. Thus, one could conclude that although substantial efforts have been made to train peer educators, to create an environment free of stigma and discrimination, and to start supporting people infected and affected by HIV/AIDS, the impact of this work is insufficiently clear at this stage as it is not clear to what extent the vulnerability of affected families and communities is reduced, nor is it clear to what extent efforts have contributed to a reduction in the HIV-incidence in remote areas and conservancies.

5.4.6 Leadership and coordination to the national response

As far as the leadership and coordination of the response to the HIV/AIDS pandemic are concerned, stakeholders usually make a distinction between the response capacity of health sector and the multi-sectoral response (MHSS 2007a). In general the majority of stakeholders
evaluate the capacity of MHSS to coordinate the response in the health sector positively, given the successful roll-out of ARV-treatment across the country.

In contrast, the national mechanisms and structures for the coordination of the multi-sectoral response, comprising bodies such as NAC, NAMACOC and the NAEC, were generally not considered sufficiently effective for a streamlined multi-sectoral response. This was attributed to mistakes in the institutional set-up, which resulted in rather confusing lines of authority; i.e. the MHSS had to call higher level ministries such as the OPM to the meetings of the NAC. As a result the higher ranked ministers would not necessarily attend personally, but send Focal Persons to attend such meetings. This generally affected the leadership and effectiveness of the multi-sectoral response. Moreover, in earlier sections on mainstreaming HIV/AIDS in the public sector and in the environment and agricultural sectors (sections 5.2.2 to 5.2.4), similar issues with a lack of leadership, as well limited support to Focal Persons, were described.

5.5 The future: climate change and the effect on human resources and skills to respond to HIV/AIDS

This chapter has so far focused on two topics. Firstly, the impact of HIV/AIDS on the population was presented, as well as the impact on specific sectors and on rural development and food security. Secondly, the capacity of certain sectors respond to those impacts was addressed. At this juncture it is relevant to make a link to conditions in the future, to put the discussion on HIV/AIDS in the context of climate change. In particular, there is a need to understand how climate change will impact on human resources and how this is affects the capacity to respond to HIV/AIDS. In this regard it is first of all relevant to understand the relation between climate change and HIV/AIDS. Once the linkages between the two issues are clear, and given the fact that we may expect more frequent droughts and floods under future climatic conditions, it would be relevant to understand how emergency management affects the management of HIV/AIDS and epidemics. In the next few sub-sections these issues are addressed.

5.5.1 The linkages between climate change and HIV/AIDS in Namibia

Chapter 1 elaborated to what extent the predicted climatic changes for Namibia may in the future contribute to more frequent droughts and floods. Although one cannot conclude with 100% certainty that the floods and droughts in recent years can solely be attributed to the changing climate, they do fit in the overall pattern of highly variable meteorological conditions that are so characteristic of Namibia’s arid climate. The recent droughts are also in line with the observed trends in temperature change and the onset of the rainy season over the last 40 years, whereas the recurrent floods fit in the picture of rainfall patterns predicted for the future.

That floods and droughts associated with a changing climate can have substantial impacts on human health, is an acknowledged phenomenon, and has been discussed in chapter 1. In
general changes in weather and climate conditions may influence the spread of infectious diseases, because the resistance of the human body to infection is reduced. Changing weather conditions may also make it easier for diseases to spread faster, as it leads to a faster development of micro-organisms and a faster spread of these organisms through air or water.

Food shortages, under-nutrition and malnutrition belong to the most important environmental and health effects of floods and droughts in Southern Africa and Namibia. Poor nutrition generally affects the immune system of human beings, thereby providing opportunity to a variety of microbes to attack the human body. Whereas under ordinary circumstances such microbes would not likely infect human beings, they have a major impact on populations with reduced immune responses. Under these stressful circumstances there is an increased risk of attracting communicable diseases, and also of infection with TB or HIV (UNDP 2004b).

In view of the potential implications of climate change for food security and human health in Namibia, an important question for Namibia is whether sectors and communities have the capacity to respond to short-term and long-wave shocks, such as floods and droughts, especially because the HIV/AIDS epidemic has already affected the resilience of farm households and communities as has been described in section 5.3.6.

Earlier in this chapter (section 5.3) we have seen that the HIV/AIDS pandemic has so far had severe impacts on the demography and health of the Namibian population, contributing to higher levels of child and maternal mortality, a decline in life expectancy and increasingly large numbers of orphans and vulnerable children, thereby exacerbating vulnerabilities in the rural farm household population. The HIV/AIDS epidemic is also likely to affect the capacity of various sectors, such as the agricultural, environment and CBNRM sectors to fulfil their mandates, as morbidity and mortality of staff affect the delivery of services in the respective sectors due to a loss of staff, knowledge, skills and institutional memory. This might have further repercussions for e.g. the management of natural resources and the quality of services delivered to subsistence farmers and beneficiaries in conservancies and parks, with potentially negative impacts on the capacity to properly benefit from wildlife, tourism and natural resource management initiatives.

Notwithstanding good results with the scaling up of ARV-therapy in the nation, the health sector in Namibia is also affected, all the more since this sector is already faced with a health worker’s challenge. The HIV/AIDS epidemic has not only led to an increase in the demand for health services, but the shortage of health workers, especially in rural areas may affect the delivery of health services and the performance of the health sector (section 5.4). This is, as far as Namibia is concerned, exacerbated by a shift in funding towards purely HIV/AIDS-related programmes to the detriment of e.g. maternal and child health programmes, the proportion of expenditure spent on in-patient services, whilst there so far has been insufficient investment in expansion of personnel capacity. The combination of factors may in the end affect the realisation of the MDGs related to maternal and child health, with potential roll-on effects for the MDGs of poverty and hunger, and possibly the MDGs in the environment sector.
Partially as a consequence of the impact on the response capacity in the sectors described above, the HIV/AIDS pandemic is also associated with declining resilience of the rural population. This is informed by the triple threat of poverty, HIV/AIDS and a reduced capacity of institutions to respond to the challenges of the epidemic (section 5.3.6). This generally leads to an increase in loss of assets, labour and skills, increased hunger and poverty amongst the rural farm household population, with the risk of completely collapsing farm household systems that lack the capacity to respond to or adapt to external shocks. Hence, an increase in the occurrence of short-term and long-wave shocks that may be brought about by climatic change and climatic variability is expected to further exacerbate the precarious situation of the affected farm household population in Namibia, caused by HIV/AIDS.

Given the ramifications of HIV/AIDS and climate change for the rural population, it is finally relevant to consider the national capacity to manage future emergencies such as floods and droughts, in terms of its effect on the spread of the epidemic. As such the results of the PDNA (2009) have provided some relevant insights, which are elaborated in the next section.

5.5.2 Emergency response and the management of HIV/AIDS and epidemics

The national response to the floods and droughts in recent years brought to light some shortcomings in the management of diseases and HIV/AIDS during emergency situations. This should be treated as a warning sign, as climate related shocks and HIV/AIDS will otherwise continue to exacerbate existing vulnerabilities, until the resilience of the rural farm household population is exhausted.

Disaster risk management in Namibia is in general characterised by a heavily response-oriented approach, as the framework and capacity for emergency preparedness and disaster risk reduction are generally lacking (PDNA 2009). Thus, there is a strong reliance on national agencies and the Namibia Red Cross Society in the response, as Regional Emergency Management Units (REMU's) are inactive until disasters occur and are thus not prepared, all the more since staff is not specifically dedicated to Disaster Management at the regional level. This situation is compounded by the highly centralised National Disaster Emergency Fund (NDEF) and cumbersome administrative procedures, as a result of which regions have limited funds to organise an initial rapid response. Other constraints relate to lack of standard operation procedures for emergency management and a weak disaster information management and communication system.

In the health sector, the ability to deliver health services to the flood-affected population appeared to be hampered, but not completely constrained. The 2009 floods caused the breakdown of the distribution system of medical supplies, as well as the disruption of community channels and networks for community care, health promotion and prevention. A limited number of clinics in the Caprivi was inaccessible, whilst in the North-Central regions at least six clinics and 86 outreach points were temporarily inaccessible. Access to health services in relocation camps was constrained, as the relocated population was short of income.
to cover the regular clinic fees. Although health officials registered gaps in the capacity and skills for disease surveillance, early warning systems in the health sector appeared to remain fairly intact, as disease surveillance and control services were merely affected in areas where telephone lines were cut off, or where patient treatment and follow-up had been made near impossible due to inaccessibility of facilities. In this regard it is positive to note that the floods did not result in the outbreak of new epidemics. Nevertheless, stakeholders in the sector were of the opinion that there was insufficient emergency preparedness at regional and district levels.

Although the response capacity of the health sector is relatively intact, the PDNA (2009) underscored that the issue of HIV/AIDS has not yet been adequately mainstreamed in emergency management practices. This primarily related to the following three observations:

- The floods caused substantial disruptions in the delivery of HIV/AIDS-related services. In general the access to health services for the treatment of opportunistic infections was hampered, as about 50% of the clinics sampled by the PDNA reported a reduction in clinic attendance. A major matter of concern was that the provision of ARV-therapy was disrupted, as approximately 23% of people who were on treatment had missed their medication for a certain period due to the floods. Similarly, PMTCT services were disrupted. The disruption was attributed to: a) the inaccessibility of health facilities; b) lack of funds amongst those who needed treatment and care to cover transport costs to health facilities with ARV-supplies, and; c) lack of food, inadequate knowledge and support systems for ART-adherence. Other HIV/AIDS-related programmes and services also suffered, such as HBC and psychosocial services, the distribution of condoms and support to OVCs, including feeding programs through schools (PDNA 2009).

- A shortage of emergency food supplies affected people living with HIV, as well as other vulnerable groups such as chronically ill persons, and OVCs, thereby increasing the risk of acute malnutrition of children. PLWHA reported that the regular provision of medication during the flood was their most important need, followed by the supply of food, water and shelter. In most cases, these vulnerable groups were not specifically recorded in camp registers and as a result their needs were not necessarily attended to, with negative implications for the ARV-treatment of PLWHA.

- The temporarily relocation of fairly large numbers of people in camps implied an increase in the risk of HIV-infection, for young people and women in particular. According to the PDNA (2009), in the absence of regular sources of income and food, an increase in transactional sex could be expected as an option to obtain food and other goods and services in the camps. The fact that not all camps had separate sanitation blocks for men and women exacerbated this situation.

Overall one comes to the conclusion that HIV/AIDS related matters, such as the treatment of PLWHA, care for OVCs and other vulnerable groups and the prevention of new HIV-infections have so far not been properly incorporated in the disaster management framework. Considering the decreased capacity of rural farm household systems to respond to external shocks in view of the onslaught of the epidemic on the farm household system, the limited incorporation of HIV/AIDS in emergency management practices is a matter of concern. For,
when continuous ARV-treatment can no longer be guaranteed during emergencies, households and communities may not only suffer the temporary setback of the natural disaster, but also negative effects on infected family members, that may have far reaching consequences for the health of household members. In case the HIV-infection turns into full blown AIDS due to the temporary unavailability of medication, negative effects on labour and skills in the family and the community can be an expected outcome.

5.6 Data availability

As far as the multi-sectoral response to HIV/AIDS is concerned the availability of data does no longer appear to be a major constraint, as agencies and stakeholders agreed to a national multi-sectoral monitoring and evaluation plan for HIV/AIDS, which was in line with UNGASS indicators for HIV/AIDS (MHSS 2006). The M&E plan was supplemented by a document that outlined the National TB and HIV targets in May 2008 (MHSS 2008c). The latter comprises 14 national level targets for the enabling environment, for treatment, care and support services and for prevention of further HIV-infections. These 14 impact indicators are complemented by 31 programme indicators, mostly at outcome or output level. According to the MTR of MTP III the most important matter in connection to monitoring system is to ensure that the data are actually provided by various agencies and parties on a regular basis and that the data are actually used.

A major shortcoming in the Namibian HIV/AIDS monitoring system is that the HIV-prevalence amongst the general population is based on models that use the ANC based HIV-prevalence to estimate and project the national HIV-prevalence. Such modelling efforts are associated with broad plausibility bounds, which could be narrowed down in case random surveys would be carried to establish the actual HIV-prevalence amongst the Namibian population by means of anonymous blood testing. This however has so far been considered inappropriate, mostly due to concerns of confidentiality of the data set.

Even more important is the lack of data on the impact of HIV/AIDS on the public sector in Namibia. So far only the Ministry of Education has undertaken an impact assessment, and it already dates 7 years back. The OPM has recently organised an actuarial study on the impact of HIV/AIDS on the public sector, but the findings have so far only been captured in a draft report that has not been released yet, as the Steering Committee has sincere questions about the relevance of the findings in view of certain assumptions made by the researchers. The absence of data on the HIV-prevalence and HIV/AIDS-related morbidity, mortality and attrition in the public sector makes discussions about the impact of the pandemic on specific sectors and on the capacity to respond far less accurate, as compared to when such data would be available. This leads to the risk of sweeping statements or providing rather arbitrary information, especially when such a discussion needs to be related to future climatic conditions, since –in the absence of current data- the response of sectors and agencies on both the HIV/AIDS epidemic and climate change will be difficult to predict 40 to 50 years ahead of time. The absence of HIV/AIDS related data (morbidity, mortality and attrition rates) in sectors that are of crucial relevance to fulfilling MDGs, that employ relatively large
proportion of public sector staff and that are moreover faced with a severe shortage of workers, is all the more strange. One would expect that high level managers in such sectors would appreciate the opportunity to analyse to what extent their staffing problems are related to the epidemic, so that they could decide on the most appropriate measures to take to address their human resources constraints. This would be all the more logical now that improved access to ARV-therapy can prolong the duration of life of PLWHA significantly, thereby also reducing or slowing down attrition rates associated with AIDS-related morbidity, provided that good medical benefit packages are made available to public sector staff.

Finally, the fact that the disaster management information system and the early warning systems are rather fragmented, and that early warning information does not necessarily reach relevant decision makers on a timely basis is a matter of concern.

5.7 Policy recommendations

In connection with the information gaps with regard to HIV/AIDS and climate change described in the previous section the following policy recommendations can be made:

- To get a better understanding of the real impact of HIV/AIDS on the Namibian population it is relevant to carry out a sample survey that would investigate the HIV-prevalence in the population by means of anonymous testing. Such a survey would first of all provide the nation with a more realistic estimate of the prevalence in the population as compared to the estimates that are modeled based on the results of Sentinel surveys amongst pregnant women. Data based on such a sample survey would in addition provide more accurate estimates of projected HIV-prevalence in the near future, which is needed for the scaling up of ARV-therapy and other services for infected people and affected households and communities.

- Secondly, it would be of utmost relevance to conduct a HIV/AIDS impact study in the public sector, or alternatively in specific sectors making up the major proportion of the public service. It would be especially relevant to consider the impact of HIV/AIDS on sectors that are faced with challenges in filling vacancies in critical parts of their establishment, such as the health sector. One could focus on sectors that play a major role in the response to both climate change and HIV/AIDS. Knowledge and information about how the HIV/AIDS epidemic will affect morbidity, mortality and HIV/AIDS-related attrition in such sectors will give relevant insights to planners and managers in those sectors, that will allow them to develop adequate strategies to mitigate the impacts on their staff on an informed basis. This would be in line with the evidence based planning frameworks advocated by NDP3 and the next MTP on HIV/AIDS.

In connection with challenges in the response capacity of the health, environment and agricultural sectors the following recommendations are made:

- In order to ensure that the performance of the health system is not affected by a shortage of health workers, it is important to expand efforts to hire or train health personnel, both for normal health care services and for HIV/AIDS related services. In this regard a new framework for donor support in the health sector that puts the investments in the health
sector in the context of national priorities around poverty reduction, food security and adaptation to climate change is needed. This means that the donor support should more strongly focus on financing recurrent (personnel) costs through e.g. budgetary support and on integrating AIDS strategies and programmes more strongly to NDP3.

- To further address the health worker shortage, in line with the MTR of MTP III (MHSS 2007a) and McCourt and Awases (2007), one could recommend a new paradigm for staffing the health services that consists of devolving responsibilities of higher level cadre to middle and lower level cadre, including nurses, clinical officers and pharmacy technicians. This can be done by sharing the various aspects of patient care and follow-up between different cadres of healthcare workers, but this obviously depends and on service delivery models, health sector policies and existing Human Resource capacity. Devolving responsibilities may therefore require changes in law and health policy to allow nurses and midwives to provide services previously only offered by doctors. In this regard one could further suggest targeting the capacities and skills of 'midlevel cadres'. Higher-level cadres should then take on the role of supporting and monitoring the midlevel cadres. To do that, they will need management training and a performance management framework for staff support and monitoring.

- In connection to the shift within program funding that was observed in the health sector with the increase in funding for HIV/AIDS, it is recommended that it is important to monitor intra-sectoral allocations across health programs to ensure that spending is in accordance with national priorities. While the increased financial support for communicable disease programs like HIV/AIDS is a welcome and much needed development, it is of utmost importance that critical areas of attention such as maternal and child health family planning and non-communicable diseases keep on receiving adequate amounts of funding. This is all the more important in view of the observed impact of HIV/AIDS on child and maternal mortality in Namibia (see section 5.3.1) and in view of the fact that the quality of health services in other African countries is also affected by high rates of HIV-prevalence (see section 5.3.8.3) (MHSS 2008d).

- In order to address the vulnerability of the rural farm household population increasing efforts to mainstream HIV/AIDS and adaptation to climate change in the rural agrarian sector are needed. As far as mainstreaming HIV/AIDS in the agricultural and environment sectors is concerned, one should try to ensure increasing attention for mitigating impacts, rather than the mere awareness of HIV/AIDS and knowing where to go for counseling, testing and treatment that can be observed so far. Thus, mainstreaming efforts would need scaling up. Mitigating impacts implies attention for support to infected persons and affected households and communities, to the extent that their livelihoods are secured, instead of dwindling under the impact of HIV/AIDS and climatic shocks. This first of all requires the attention of high level decision makers in those sectors, as well as adequate resources for capacity building and awareness raising on linkages between climate change, human health, HIV/AIDS and rural development. In relation to this one may further need to consider a broader analytical framework that allows for linking topics of climate change and HIV/AIDS to priority development goals, such as poverty reduction and HIV/AIDS. This requires a stronger focus on the identification of
vulnerabilities and on strengthening capacity to increase resilience. This could be achieved by a focus on analyzing so-called hotspots of environmental and social change. Hotspots are locations where human interaction with the environment is considered to be adverse to the sustainability of an ecosystem and the human activities dependent on it (UNDP 2004b). In other words hotspots are locations where environmental carrying capacities and other thresholds are severely exceeded, as a consequence of which the adaptive capacity is affected to such an extent that a return to ordinary conditions is at risk. If a hotspots framework, specifying both environmental, climatic, health, HIV/AIDS and food security indicators, would be integrated in the early warning systems in Namibia, substantial gains could be made in the early identification of crisis situations. This could strengthen the initial response to emergencies resulting from droughts or floods, but also the response to slow long-wave shocks related to HIV/AIDS and slow onset droughts.

- In view of the shortcomings in HIV/AIDS management during emergency situations, more efforts should be undertaken mainstream HIV/AIDS in emergency management procedures and practices. In line with the PDNA (2009) one can recommend a more systematic integration of HIV/AIDS in the emergency management and risk reduction efforts. This first of all implies ensuring that the needs of PLWHA and affected households during emergency situations need to be addressed with priority, e.g. through timely provision of medication, food, water and sanitation service. Secondly, in the short term (after the emergency) this implies focusing on restoring common HIV/AIDS related services such as condom provision, VCT, ARV and PMTCT therapy, as well as HBC and support services for OVCs as soon as possible. In addition, there is a need to look into the preparedness for HIV/AIDS during emergencies, in terms of integrating the prevention of new HIV-infections and the treatment and care of PLWHA in the emergency response activities, e.g. through the preparation of contingency plans.

- Finally, overall, the question how vulnerabilities related to HIV/AIDS and climate change should best be addressed in the Namibian context, should get more attention and priority. At this stage the best options to address these vulnerabilities have not been clearly identified, whilst various debates in different sectors have been happening in recent years. The health sector e.g. has strongly focused on the scaling-up of ARV treatment. In the emergency managements sector the focus is on the change of response to preparedness. In the environment sector the focus is on adaptation to climate change and using resources of the clean development mechanism, as well as on sustainable land management with ample attention for CBNRM practices. However, whereas matters of poverty reduction, gender, HIV/AIDS and environment have been integrated in NDP3, one cannot avoid the impression that matters remain relatively fragmented. Critical issues, such as the impact of food aid on the dependency of rural communities, or the potential gains that a Basic Income Grant could bring in reducing vulnerability, have also not been resolved or are avoided. Thus, the discourse on addressing vulnerabilities should be strengthened, with the aim to identify the best strategies and options to mitigate impacts of both HIV/AIDS and climate change, possibly through the hotspots framework presented above.
5.8 References


