

POLICY REVIEW: WATER SECTOR IN NAMIBIA

1. Introduction

Namibia has a long history of water scarcity due to the arid climate and high evaporation rates (Dirkx et al., 2008). Furthermore, the lack of readily available water in the interior of the country is highlighted as an important limiting factor for development (GRN, 2004a). The challenges with respect to water management are compounded as many of the perennial rivers are shared with several other countries (GRN, 2004a). The surface water scarcity has historically resulted in a reliance on groundwater, though this source of water is also limited due to low recharge rates and periodic ephemeral floods. Water resources are further vulnerable to pollution through the use of pesticides and fertilisers in agricultural activities (GRN, 2004a).

In Namibia there are still portions of the population that are without access to adequate water supply and sanitation. As such, part of the aim of the Vision 2030 for the country is to have the majority of its citizens have access to safe drinking water (GRN, 2004a). Specifically by 2030, the goal is to have various water access technologies in place, to achieve water supply improvements and ensure freshwater resources are free of pollution. The Vision 2030 further seeks to ensure that these water resources are used to ensure social well-being, support economic development, and to maintain natural inhabitants (GRN, 2004a).

It is recognised that the strategies for integrated water resource management and water demand management are essential if the country is to realise its goals for social well-being and economic development, whilst ensuring environmental health (GRN, 2004b). The Vision 2030 for the country is operationalised through successive five-year National Development Plans (NDPs). The latest of these is the fourth NDP for the period of 2013 – 2017 which aims at ensuring water security for human consumption and industrial development, through recharging strategic aquifers, recycling and reusing water, as well as addressing water demand through water-saving technologies (GRN, 2012).

However, the planning for addressing the water supply and demand needs of the country has to take cognisance of climate change. In the long-term climate change is likely to exacerbate the water supply and management problems facing the country. As such, the country's 'Intended Nationally Determined Contributions (INDC) emphasizes that climate change adaptation is of prime importance to the country. Specifically the INDC recognises that long lasting floods and droughts will have impacts on human well-being and developmental growth that could result in decreases to the country's Gross Domestic Profit (GDP) (GRN, 2015).

In order to achieve equitable access to potable water and freshwater by all Namibian citizens there is a need for strategies and the formulation and implementation of new water policies and the development of appropriate technologies (GRN, 2004a). The Namibian Climate Change Policy stresses that the need to develop new technologies and the transfer of existing appropriate technologies cannot be ignored. Specific to the water sector is the need for the development of new technologies to address climate change issues related to water shortages for agricultural production (GRN, 2011). However, as noted in the INDC, critical to promoting adaptation is the need to overcome recurrent gaps faced by the country related to restricted access to the latest technologies and funding (GRN, 2015).

This report provides a review of Namibia's policies and strategies that have a water and climate change/climate technology component with a focus on the key sectors for climate change adaptation within the country.

2. Water and climate change policy in Namibia

2.1 Water related policies

Broucke et al. (2005) state that even without the impacts of climate change taken into consideration, the country could face absolute water scarcity in the short to medium term. As such the country has implemented numerous measures to reduce freshwater depletion and to enhance the value of water. These efforts include a stricter approach to water pricing, water conservation, trans-boundary water agreements and the development of water re-use and reclamation strategies (GRN, 2004a). The country has therefore been proactive in implementing technologies to ensure potable water supply in some areas. In Windhoek for example, the first potable water treatment plant, the Goreangab Water Reclamation Plant, was constructed in 1969 which treated blended water (Chen et al., 2015). The country has seen significant policy reform for the water sector that has enabled this type of progress to be made.

At the core of the policy reform in recent decades is the Integrated Water Resources Management (IWRM) Plan. The IWRM Plan states that due to the dry climate and unpredictable rainfall, water resources challenges in Namibia can only be addressed through a high degree of efficient water resources management. The long term objective of the IWRM Plan for Namibia is to enable the country to achieve a sustainable water resource management regime contributing to social equity, economic efficiency and environmental sustainability in the country (GRN, 2010a).

The Plan also stresses the need for the use of unconventional water resources to alleviate water supply deficiencies that include (GRN, 2010a):

- Desalination of sea water
- Re-use of water to water parks, grounds
- Recycling of water used in industrial and mining processes
- Reclamation of water from waste water effluent
- Artificial recharge enhancement of aquifers
- Mixing of potable water and brackish water to improve quality
- Water demand management through conservation of water by reducing unit consumption and wastage

The IWRM Plan further provides actions and recommendations that are needed in the country. These include ensuring that water resources are managed with full consideration of climate variability and climate change.

The National Water Policy White Paper (GRN, 2000) is in harmony with the IWRM principles and provides a policy framework for equitable access to water resources and sustainable water resources management and water services to support integrated management of Namibia's water resources. The important need for new approaches for the assessment of water resources is emphasized such that current inadequacies in data management can be corrected. The Policy White Paper also highlights the need for a new strategic agenda for the future management of Namibia's resource base and states that this effort will require focused scientific research for proper management. Such efforts will require commitment to ensuring that the relevant information is accessible by the technical and scientific community as well as the general public. The Policy White Paper also highlights the goal of developing systems of water resource management that can effectively deal with the extreme hydrological risk and natural vulnerability faced by Namibia. This Policy White Paper (GRN, 2000) further recommends that Namibia adopt a systematic approach to water resources management, using an integrated, multi-sectoral framework that considers issues of decentralization, social equity, ecological protection, and economic growth.

The Water Resources Management Act, (WRMA) No. 24 of 2004 (GRN, 2004b) replaced the Water Act, No. 54 of 1956 taking cognisance of the legal requirements to implement the IWRM plan such that Namibia's water resources are managed, developed, protected, conserved and used in ways which facilitate equitable access to water resources by every citizen, in support of a healthy and productive life. The WRMA (2004) further states that integrated planning and management of surface and underground water resources, in ways which incorporate the planning process, economic, environmental and social dimensions is needed. In prescribing procedures as to how to develop and adopt efficient water management practices the WRMA (2004) highlights efficiency in improved water technology, particularly improvements in irrigation technology (GRN, 2004b).

The WRMA (2004) was viewed as being deficient with respect to clarifying the responsibilities for implementation of these goals. The Water Resources Management Act of 2013 was therefore promulgated by the Namibian government in December 2013 and the WRMA (2004) was repealed. The overarching aim of the WRMA (2013) is to provide for the management, protection, development, use and conservation of water resources, to provide for the regulation and monitoring of water services and to provide for incidental matters (GRN, 2013). A fundamental principle of the WRMA (2013) is the promotion of the sustainable development of water resources based on an integrated water resources management plan which incorporates social, technical, economic, and environmental issues. The responsibilities for ensuring the sustainable development and use of water resources are delegated to the regional/basin level to involve people at local level in watershed management and planning. The WRMA (2013) further calls for the establishment of a 'Water Advisory Council' that to advise the minister on matters such as water policy development and review and water resources management (GRN, 2013).

In terms of water supply and sanitation, the first policy, the Water Supply and Sanitation Policy (WASP) was adopted in 1993. However this policy was replaced by the Water Supply and Sanitation Policy (2008) with the pledge to ensure availability of essential water supply and sanitation services to all Namibians at affordable costs. The WASP (2008) provides a priority ranking that should be applied in the case of water shortages, with the first priority being for the provision of water for domestic use and the second priority is the provision of water for economic activities. However, the policy does state that the priorities for the allocation of water for economic activities will have to be determined on an individual basis using the respective economic value as part of the consideration process (GRN, 2008a). The National Sanitation Strategy for the 2010/11 – 2014/15 period provides a framework that outlines the approaches and activities that the Sanitation Sector intends to take in order to achieve sustainable success in the medium term (GRN, 2009).

2.2 Climate change related policies

2.2.1 *Climate Change Strategy*

With climate change it is expected that by 2065 changes to rainfall patterns over the catchments of the Zambezi, Kavango, Cuvelai and Kuene rivers are likely to lead to a 25% reduction of runoff and draining in these river systems. Rainfall is however, expected to increase over the southern regions of the country which could result in increased dam yields, though further research is needed. Overall though, it is estimated that the country will incur a reduction of groundwater recharge (Dirkx et al., 2008). As groundwater abstract is greater than the recharge rate in many places the groundwater resources in the country are already vulnerable (Dirkx et al., 2008).

There is now general agreement that there is great value in managing water resources within natural hydrological units such as river and lake basins, by conserving and protecting watersheds/catchment areas. The Namibian Climate Change Strategy and Action Plan

recognises (Mfuno et al., 2009) that the promotion and support of the development and transfer of technologies for mitigation and adaptation, for the water sector the need to consider the following:

- The development and management of watershed management plans;
- The promotion of soil and land conservation in watersheds;
- The restriction of access to and use of resources in watershed areas;
- The afforestation of degraded watershed area; and
- The decentralization of management of water resources to catchment management zones.

The strategy further recognises that in the face of increased predicted water demand linked to a growing population, compounded by climate change, requires the promotion of integrated water resources management to ensure sustainable conservation and use of water resources (Mfuno et al., 2009). As such the strategy highlights key actions that need to be taken within the short-medium and long-term to achieve these aims that include:

- Conserve and manage watershed / catchment areas
- Promote integrated development and management of water resources
- Promote conservation and sustainable utilisation of water resources
- Improve trans-boundary cooperation regarding water resources
- Support institutional and human capacity building in water resources management and use

These actions include developing and investing in additional methods of water supply such as innovative storage of rain water and the construction of dams (Mfuno et al., 2009). In support of these actions it is recognised that there is a need to enhance the capability of monitoring changes in water (quality and quantity) and in modelling projected changes. The strategy further speaks to the need to reduce the impacts of poor drinking and potential disease outbreaks due to inadequate sanitation. Specifically there is a need to establish where services are lacking, and to provide sanitary services in those areas. Furthermore developing an understanding the potential impacts of floods and other climate change related disasters is key to the country being able to adequately respond (Mfuno et al., 2009). The technical and research capacity to inform such monitoring and monitoring of water resources and understanding the potential impacts of climate change in the country is therefore needed.

Furthermore the need for the country to be able to respond to water shortages or floods is highlighted in the strategy (Mfuno et al., 2009). The strategy also recognises that water infrastructure needs to be protected during floods and droughts and the need to ensure adequate water supply to vulnerable urban and rural areas. As such actions that promote reducing pollution of water, water conservation (water recycling and reuse and reduction of water wastage) and the adoption of water efficient technologies are suggested as key actions that the country needs to take (Mfuno et al., 2009).

Given the fact that Namibia has shared water resources with Angola, Zambia and South Africa there is a need for transboundary co-operation with these countries that should include sharing of information, joint research and investments in enhancing water security to alleviate poverty (Mfuno et al., 2009).

2.2.2 National Policy on Climate Change

To ensure sustainable long-term access to water, and effectively manage and conserve the country's water resources with the uncertainty of climate change, the government aims through its The National Policy on Climate Change for Namibia (GRN, 2011) to develop and implement appropriate adaptation strategies and actions that will lower the vulnerability of Namibians and

various sectors to the impact of climate change (GRN, 2011). This policy recognises that climate change impacts are expected to affect water availability through increased variability of rainfall, temperature increases, prolonged and more severe droughts, declining soil moisture and increased evapo-transpiration. The policy further seeks to ensure that the manner in which climate change impacts are managed take cognisance of the national developmental goals such that the benefits for the country are maximised and negative impacts are reduced. Specifically the government will aim to:

- Formulate and implement a strategy for harvesting and capturing water during the rainy season and provide guidelines for more efficient water use by sectors, households and individuals
- Be flexible in water use allocations and increase coverage of water supply and water treatment facilities across sectors, households and individuals targeting both rural and urban communities at local, regional and national level
- Promote and encourage integrated water resources management, including contingency planning for extreme events such as floods and droughts
- Promote and encourage artificial recharge of groundwater in arid and semi-arid environment
- Construct new water facilities, infrastructure and promote alternative water access e.g. desalination and fog harvesting as well as optimizing the existing facilities
- Prevention of water pollution

The policy makes provision for regional cooperation in order to deal properly with trans-boundary issues related to climate change (GRN, 2011). Furthermore as the irrigation sector accounts for a relatively large percentage (41%) of the water used in Namibia it is identified as having significant potential for water savings through the implementation of water demand management initiatives (GRN, 2010). The government also has identified the need to make the provision and installation of water treatment plants an integral component of all irrigation water supply schemes (GRN, 2011). The policy further highlights the need for technological development to address climate change issues related to water shortages for agricultural and that the technological development should be sustainable, affordable and ensure skills transfer (GRN, 2011).

2.2.3 Intended Nationally Determined Contributions

Namibia does not have binding commitments to the international community to take climate change action as it is a Non-Annex 1 Party to the United Nations Framework Convention on Climate Change (UNFCCC). However the country has demonstrated its commitment to tackling climate change through the development of the climate change strategy and policy mentioned above. Recently the government has developed its INDC that presents the country's goals for both mitigation and adaptation. These goals are primarily based on existing policies and plans and prioritise actions based on the potential for successful adoption at a national level (GRN, 2015).

The INDC further stresses that even though the country is still to develop its National Adaptation Plan (NAP), experiences of disastrous climate change impacts in the country has necessitated the country to incorporate climate change adaptation into the development agenda. The INDC also highlights that many of the responses that the country has taken to deal with developmental challenges can be seen as adaptation actions as these serve to increase the resilience of communities. For the water sector in particular, actions such as wastewater recycling, rural water supply and artificial recharge of aquifers are highlighted (GRN, 2015) as examples of actions currently being undertaken. The INDC also emphasizes that inadequate

human capacity and restricted access to the latest technologies are some of the barriers to enabling the country to embark on adaptation in sectors already strained by climate change (GRN, 2015).

3. Sectoral end-users

3.1 Agriculture and food production

The National Agricultural Policy (2005) seeks to provide an enabling environment for smallholder producers to increase food production such that food security and nutritional levels of all people in the country can be improved (GRN, 2005). There is however, recognition that there is a lack of policy actions that promote the implementation of this policy.

The agricultural sector consumes about 75% of water in the country, with the commercial agricultural being the largest sub-sector and communal farmers being the least consumptive (Dirkx et al., 2008). The majority of the water demand within commercial agriculture is for irrigation (up to 80%) with the remainder used for livestock rearing. It is estimated that during the period between 1995/96 and 2002/03 the area under irrigation rose by 48% with the need for water for irrigation growing by similar percentage (44%) (Dirkx et al., 2008). Despite being a significant user of water, its contribution to country's GDP is around 10%. The value added to the water used for agricultural activities highlights a need to ensure that the proportion of water used for high value agricultural products should be prioritized (GRN, 2004a).

The Vision 2030 for the country emphasizes the need to increased agricultural productivity in order to achieve food security. The Green Scheme Policy was devised in support of this national objective, with the goal of promoting increased investment and food production through the use of irrigation. Specifically, it is stated that improving the productivity of agricultural production of poor people, provides options for reducing poverty and enhancing their food security (GRN, 2008b). The policy aims to specifically target irrigation opportunities along the maize triangle and to promote agro-projects in the south. Through the mobilization of private and public capital it is envisaged that local people will capacitated to improve productivity and that appropriate technology transfer will occur (GRN, 2008b).

For the current period of the NDP the goal is to achieve an average real growth rate of 4% (GRN, 2012). It is envisaged that the continued promotion of the Green Scheme by expansion of existing and establishment of new irrigation projects and initiatives such as assisting livestock producers in communal areas to access markets is needed to achieve this goal.

Some planned irrigation projects are already underway, which means that a future increase of the irrigated crop production sector should be expected. However, while this might expand, it is stated that it would probably not be profitable to invest in irrigation to expand cereal production. Specifically, with the predicted impacts of climate change, it is expected that commercial cereal production sector is likely to suffer losses even in a best-case climate change scenario, as the viability of irrigation expansion is questionable for these crops (Dirkx et al., 2008).

Concerning the livestock production sector, the National Small Stock Development Plan (2004) is a co-ordinated approach to the development of the small stock sector to increase its contribution to the national agricultural output, to ensure agricultural value adding and improved balance of trade. However there is general agreement that carrying capacity will be reduced because of climate change (Dirkx et al., 2008).

The country further has policy in place to deal with drought, the Drought Policy (2010) which has implications for this sector. The policy aims to develop an efficient, equitable and

sustainable approach to drought management. Specifically, the policy seeks to take away responsibility of managing drought risk from the government to the farmer, to encourage on-farm management of risk and water supply and demand management.

3.2 Mining and industries

The mining industry in the country has been described as being fairly diligent when it comes to the management of water with most mines recycling water and thus reducing water demand (GRN, 2010a). However, the development of water management plans for each mine and the prevention of ground and surface water pollution remain challenges (GRN, 2010a).

The Minerals (Prospecting and Mining) Act, No 33 of 1992 is focused on mineral extraction but also provides some provisions for groundwater abstraction. The Environmental Management Act (EMA), No. 7 of 2007 requires that all ecosystems be provided with sufficient water to meet their ecological requirements or that adequate environmental flow are available to sustain water dependent ecosystems. To obtain groundwater abstraction permits that comply with the purposes and mandates of the EMA, a mining company will also have to comply with water policies such as the WRMA.

The country seeks to stimulate industrial development (GRN, 2004a), which would mean that water consumption from this sector could be expected to grow in the future. As such there is a need to ensure that industries are equipped with water-efficient technologies for improved water management (GRN, 2005). It is important that such technological innovation occurs within the context of building local capacity so that industries do not have to rely on international experts when there is a need for maintenance or expansion on the technology used (GRN, 2005).

The fourth NDP aims to ensure that by 2017 there will be sufficient water reserves for industrialization (GRN, 2012). It is reported that the mining and industrial sector are actively involved in water supply development projects and water scheme operations. In Windhoek for example, the local beer brewery installed a dual pipe system so that backwash water from the carbon filters could be re-used for purposes such as irrigation (GRN, 2010b). In the mining sector as well, recycling (reuse of water without further treatment) of water from slimes dams occurs (GRN, 2010b).

3.3 Urban and rural settlements

Domestic users are an important group of water users, with urban populations being responsible for most of the domestic water consumption (Dirkx et al., 2008). However it is estimated that 11.9% of rural households rely on flowing or stagnant water sources, while 77.4% use buckets or the bush for sanitation, with most urban households having access to piped water (GRN, 2012). As such the country faces challenges with respect to the provision of safe water and sanitation facilities. It is expected that over the next 30 years water demand will increase rapidly in certain areas and that there are likely to be challenges in distributing the available water to where it is most needed (GRN, 2004a).

The fourth NDP (GRN, 2012) aims to reduce the proportion of severely poor individuals from 15.8 % in 2009/10 to below 10% by 2017. The provision of clean water to all households is key to helping reduce poverty. The desired outcome in the fourth NDP with respect to water is increased access to water for human consumption from 85.5 to 100% of the Namibian population (GRN, 2012).

Many of the communities within the remote and rural areas of the country are impoverished thus making households particularly vulnerable to food insecurity (Woltersdorf et al., 2014). In

efforts to supplement food supplies, subsistence farming is a key aspect to the livelihoods of these communities. As such the Poverty Sectoral Plan (2013-2017) includes a component on increasing household food security. It is reported that whilst many (especially women) would like to increase the amount of food they grow at home, it is not possible to do so due to the lack of water for irrigation (Woltersdorf et al., 2014).

Rural domestic water consumption further faces challenges or improvements related to (GRN, 2010a):

- Due to pipe bursts in branch lines, water is lost and is not billed, as such there is a need to devise a mechanism on how to bill water
- There is a need to replace or upgrade existing infrastructure to improve the reliability of water supply schemes with fewer interruptions and proper maintenance of water
- More frequent monitoring of water quality in schemes not supplied by NamWater is required

In some areas progress has been made in reducing water consumption e.g. the Walvis Bay Municipality reported 38% reduction in water consumption in 2007. This was achieved by appropriate pricing of water services, the sale of recycled semi-purified water for use in gardens and the use of seawater as opposed to drinking water in some of the fishing industry processes (GRN, 2010c).

Further to there are many excavation/earth dams found in the country, which are primarily used by communities for livestock water supply. These dams are seen having the advantage of the water being free to use for people and livestock to use, though much of the water is lost through evaporation. Water in earth dams are also normally dirty, and has to be filtered and boiled before it is safe for people to drink (GRN, 2010d).

In some areas such as the Tsondab-Koichab River Basin there are concerns over the sustainable recharge of the Koichab aquifer, which prompted development plans to include exploring options of seawater desalination to supply the area (GRN, 2010e). In the Ugab-Huab River Basin most of the groundwater is provided through and pipeline schemes. Some settlements also receive water from springs and hand-dug wells along the rivers are also quite common in the basin. A challenge to transporting water from rivers to the people and also to maintain water supply infrastructure to abstract, treat and distribute the water to the consumers, as well as to prevent pollution (GRN, 2010f).

As part of the technology needs assessment for the country, water security in rural areas with subsistence farming was identified as areas that are likely to be severely affected by drought and reduction in rainfall due to climate change. As many of the rural areas have brackish or saline groundwater, and as such desalination would provide a means to provide these communities with water, especially during periods of drought. The advancement of desalination technologies in recent years and subsequent lowering of treatment costs therefore makes desalination a potential option for small to medium size communities (GRN, 2005). However at the time of publication, it was felt that gaps still existed in understanding the number of communities located above brackish and that susceptibility of these rural communities to prolonged drought has not yet been quantified (GRN, 2005).

Under conditions of climate change, communities are likely to be at risk from floods and or droughts. The Disaster Risk Management Policy (2009) aims at improving disaster risk identification and improving disaster risk mitigation and management and strengthening disaster preparedness for effective emergency response. Further to this the Drought Policy (2010) aims to ensure that in the event of droughts that the household food security would not be compromised and to ensure the continuous supply of potable water to communities, and

particularly to their livestock, schools and clinics. The Drought Policy (2010) further aims to enable rural inhabitants and the agricultural sector to recover quickly following drought and that the health status of all Namibians is not threatened by the effects of drought.

The government also has identified the need to make the provision of safe water and sanitation facilities mandatory for the public in affected areas and other public facilities such as hospitals and schools (GRN, 2011). Furthermore in order to effectively ensure sustainable management of infrastructure and developmental challenges related to climate change, the government will need to establish and enforce standards for infrastructure development such as roads, housing, and water infrastructure through monitoring and report systems (GRN, 2011).

3.4 Tourism

The Tourism Sector was identified as one of the major growth sectors in the country, with the environment-based tourism in particular being a fast growing and significant industry (Mfune et al., 2009) with the potential for the number of lodges established in the country to increase. These tourist lodges are likely to increase the water requirements in the sector and as such there is a need to prevent over abstraction of water. Furthermore, there is a need to ensure that wastewater and refuse do not contaminate the groundwater (GRN, 2010a). It is however expected that if water demand measures are implemented at such lodges significant savings of water could be achieved. For example, some resorts report on savings from 30 to 50% through improved maintenance (GRN, 2010a). The Tourism Policy (2008) does however state that all tourism developments must conform to the provisions of the Environmental Management Act, 2007 and other relevant legislation (including water related policies) (GRN, 2008d).

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