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THINK NAMIBIA

FACT SHEET ON:

Water Innovations

INNOVATIVE APPROACHES TOWARDS WATER SECURITY IN NAMIBIA

The purpose of this fact sheet is to share information on the innovative approaches that have been implemented in Namibia, to minimise the impacts of water insecurity due to climate variability.

Introduction

Namibia is an arid to semi-arid country with scarce and unpredictable rainfall and the average annual rainfall is 250 millimetres per annum. Most of Namibia receives summer rainfall, except for the south-western part that receives some winter rainfall. Due to the erratic rainfall conditions, the flow in the rivers in the interior of Namibia is ephemeral, irregular and unreliable. The potential of the ephemeral surface water sources is therefore very limited and the water can only be used when the runoff is harnessed in dams during the rainy season. The pattern of rainfall is highly seasonal with rain during the summer months (between October and April) in the north and winter rainfall in the south. The perennial rivers are located at the northern and southern borders of Namibia; hence all four of these rivers (Okavango, Kunene, Zambezi and Orange-Senqu) form part of shared watercourses with other States situated along the banks of these rivers.

Demand centres located in the interior of the country are far from the perennial water systems and centres typically rely for water supply on dams built on ephemeral river systems (Kinyaga, 2015). Namibia's water demand challenges include:

- As indicated by Heyns 2008, the agricultural sector is the largest water use sector in the country. Over 40% of water demand is for irrigation. The demand is expected to increase to about 65% by the year 2030. Irrigation mainly takes place on the perennial river systems. There are irrigation schemes at the Hardap and Naute dams in the south, Stampriet and Karst aquifers, Etunda and Ngonga Linena irrigation schemes in the northern parts of the country (Heyns, 2008).
- Meeting domestic water and industrial demand in the interior of Namibia is becoming a challenge due to increasing population caused by urbanisation. This calls for improving operations and management of water infrastructure as well as investments into innovative systems to address the water needs (IWRM Joint Venture, 2008b).
- The basic policy and legal framework incorporating IWRM is well established in the Water Resources Management Act, Act 24 of 2013 but the associated regulations (through which the Act is enforceable) lag behind. For this reason water use, abstraction as well as pollution control are still regulated through the Regulations associated with the outdated 1956 Water Act (Kinyaga, 2015).

The World Resources Institute (WRI) recently scored and ranked future water stress – a measure of competition for and depletion of surface water – in 167 countries for the years 2020, 2030, and 2040. Of these, 33 countries face extremely high water stress in 2040. Projections indicate that Chile, Estonia, Namibia, and Botswana could face an especially significant increase in water stress by 2040. This means that businesses, farms, and communities in these countries may be more vulnerable to scarcity than they are today.

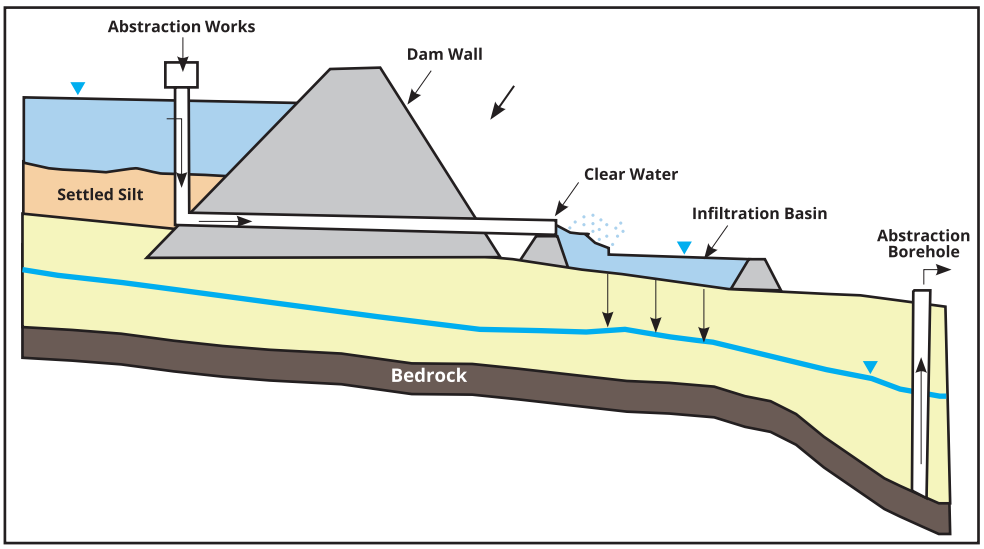

FIGURE 1:
Omdel Dam Artificial Recharge Enhancement Project on the Omaruru River

Innovative Approaches to ensure secure water supply

Namibia implements various water conservation and water demand management approaches. Innovative approaches to addressing the country's water insecurity include the following:

Inter-basin transfers and integrated use of dams

Inter-basin transfer is when water is transferred from one water basin to another. Windhoek, which is also the biggest industrial and financial centre in Namibia relies mainly on three major dams, the Von Bach and Swakoppoort dams on the Swakop River and the Omatako Dam for its water supply.

Future planning to provide sufficient security of supply for Windhoek is based on the integrated use of the three dams together with banking of groundwater in the Windhoek aquifer and the conjunctive use with the groundwater resources of the Karst Area *(IWRM Plan Joint Venture Namibia, 2010)*.

Artificial enhancement of aquifer recharge and water banking

Artificial recharge is when surface water runoff is stored in a dam to allow sediments and silt to settle without addition of chemicals in the dam. The Omdel Dam artificial recharge enhancement project situated some 40km east of Henties Bay on the Omaruru River is one such example of this innovative technology *(IWRM Plan Joint Venture Namibia, 2010).* Water banking is when water is purposely diverted and stored underground to be used in periods of scarcity.

Groundwater can be created by using dewatered aquifer space to store water during the years when there is abundant rainfall. This water can then be pumped and used during years that don't have a surplus of water *(https://en.wikipedia.org, 2015)*.

In Windhoek, surface water from the Von Bach Dam is purified in a water treatment plant and stored underground in the Windhoek aquifer. This results in lower evaporation and overflow losses at the dam and in years that the surface water sources (i.e. the three dams providing Windhoek with water) cannot provide enough water, stored underground water can be abstracted *(IWRM Plan Joint Venture (2010 b)*.

Water Reuse, Recycling and Reclamation

Reuse, recycling and reclamation are technologies that allow for water that has already been used to be utilised again. The Gammams wastewater treatment plant is the county's biggest wastewater treatment plant with a capacity 26 Ml/day (One mega litre of water is equal to one million litres of water. That is 1000 cubic metres. Semi-purified water is pumped from this plant to the new Goreangab Reclamation Plant where the water is further treated and supplied to the residents of the City of Windhoek.

Overall, water that is supplied to a water user by means of a water scheme is not free and has a cost. The water cost comprises a fixed cost component to recover the capital and interest required to develop the water scheme and a variable cost component to recover the cost to operate the water scheme. Figure 3 explains how the financial cost of supplied water is calculated.

This water undergoes various processes to ensure that the water supplied is safe and potable *(IWRM Plan Joint Venture Namibia. 2010)*. Positive efforts are being undertaken by the private sector. Namibia Breweries Limited, has a system in place that makes reuse of the backwash water from the carbon filters for washing of vehicles and irrigation of gardens. Carbon filtering is generally used in water filtration systems whereby a bed of activated carbons, through the process of chemical absorption, is used to remove chemicals and contaminants. *(https://en.wikipedia.org)*

FIGURE 2:
Areva Desalination Plant

Desalination of sea water and brackish groundwater

Desalination is the removal of salts, minerals and impurities in water. The Areva mine desalination plant located at Wlotzkasbaken, 30 km north of Swakopmund, is the first of its kind in southern Africa. The plant utilises state of the art technologies including rotary filters, multi-stage ultrafiltration, reverse osmosis, and chemical treatment to treat seawater to a potable state that can be used for mining purposes *(http://www.areva.com, 2015)*.

The CuveWaters project has installed innovative desalination pilot plants in the two villages of Amarika and Akutsima in northern Namibia. These plants operate on solar energy and can produce up to 5 m³ (5 000 litres) water per day, which is used by the residents for every day needs.

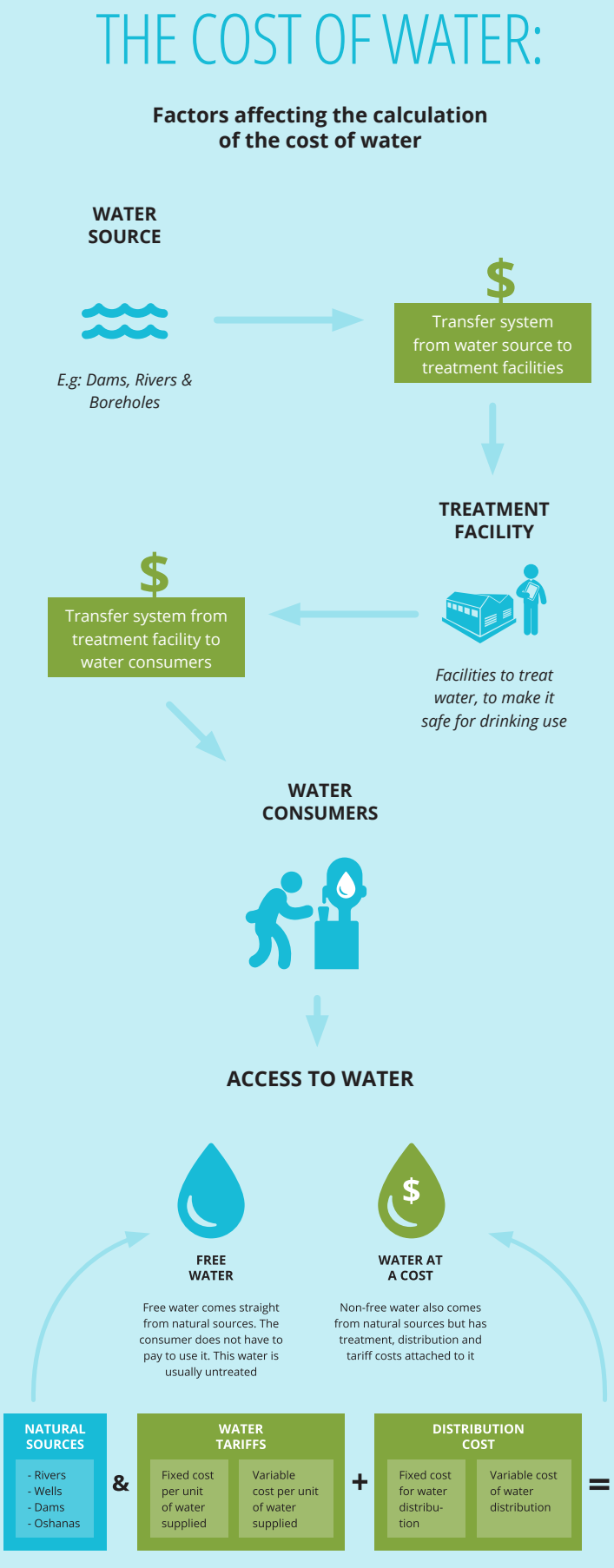

FIGURE 3:
Factors affecting the calculation of the cost of water
(Source: Developed by HSF with reference to the article 'The Cost of Water' by Piet Heyns, DRFN).

Conclusion

In view of the arid nature of the climate of the country, a vast array of innovative activities have taken place over many years to ensure water security. These have resulted in the development of policies, legislation, plans and strategies in an endeavour to achieve the overall goals of water resource management and sustainable water use. To ensure sustainable long-term access to water, effective management and conservation of the country's water resources; the government of Namibia, will have to strengthen national capacities to reduce climate change risks and build resilience for any climate change shocks by increasing its investments towards innovative approaches to ensure water security.

Glossary:

Water security
Having sufficient water resources to meet the demands of the country's main sectors.

Ephemeral rivers
Rivers that flow only after heavy rainfall.

Perennial rivers
Rivers that flow throughout the year.

Aquifers
Geological formations in which groundwater is found and this water is abstracted through boreholes.

River basin
Water catchment which is demarcated according to the common drainage flows of major water sources such as rivers, groundwater systems (aquifers), water supply canals and pipelines.

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Authors:
Bernadette Shalumbu and Rennie Munyayi
Desert Research Foundation of Namibia
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Hanns Seidel Foundation

DRFN
Enhancing decision making for sustainable development

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FOR MORE INFORMATION CONTACT THE ENVIRONMENTAL AWARENESS AND CLIMATE CHANGE PROJECT:
Hanns Seidel Foundation Namibia, House of Democracy,
70-72 Dr Frans Indongo Street, Windhoek West
P.O. Box 90912, Klein Windhoek, Windhoek, Namibia

Tel: +264 (0) 61 237373 **Fax:** +264 (0) 61 232142 **Email:** enviroproject@hsf.org.na
www.enviro-awareness.org.na