

# Wetlands and Sustainable Livelihoods: Alternative Means of Water Security in the Drought Season Within the Rural Communities in Limpopo Province of South Africa

**PN Mabule**

University of Mpumalanga, South Africa

**D Baloyi**

University of South Africa, South Africa

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**Abstract:** This paper argues that wetlands conservation is a viable tool to sustain livelihoods and secure water. South Africa climate is characterised by periods of La Nina and El Nina, unfortunately, the country is experiencing the El Nina season (period of dry spells) and the communities at the peripheries are affected mostly by these phenomena. As the drought continues to devastate most of the country as recurrent characteristics of the climate change, livelihoods of ordinary South Africans are threatened. Therefore, with highly constrained freshwater resources, weather extremes such as drought imposed by climate variability and change affect the limited water. The conservation of wetlands in South Africa can be a tool for sustainable livelihoods and ensure water security if they are well maintained and preserved. Evidently, since the drought, the agricultural sector growth has realised a decline of 12,6%, with most of the rural communities relying on the agricultural sector for food, farming and as a source of employment. Groundwater is much slower to be affected by drought than surface water and worldwide groundwater has proved to be a good buffer against drought, despite these enormous benefits wetlands continue to be lost and degraded at an alarming rate due to the problems of pollution, agricultural expansion, and urbanisation and is vulnerable to development. This paper concludes that the loss and degradation of wetlands undermine the sustainability of the development that is often responsible for their demise.

**Keywords:** Conservation, Drought, El Nina, La Nina, Livelihoods, Sustainable, Wetland

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## 1. Introduction

Wetlands are at the centre of livelihood around the globe. They have proven to be essential for human health, prosperity and provide enormous economic and social benefits that add value to the society. Wetland conservation can yield significant benefits to local communities in South Africa. Ensuring the conservation and sustainable use of this resource can lead to maximised benefits for the future. In their role of natural infrastructure wetlands underpin the availability of clean water for drinking, protects us from extremes of drought and flooding and plays a significant role in recycling nutrients and chemicals thereby allowing us to sustainably manage waste. The long-term effects of these benefits of wetlands enable our communities and economies to continue to function and sustain system-wide livelihoods for both the poor and the elite.

South Africa has a known water scarcity problem that is increasing by the advent of worldwide climate

change (Sershen, Rodda, Stenström, Schmidt, Dent, Bux, Hanke, Buckley & Fennemore, 2016; Fairall, 2018), with a rainfall of 500 mm, placing it well below the global average of 800 mm, it is a water-stressed country (Kohlers, 2016). Due to the prolonged El Nina period in South Africa since 2015, drought conditions have been experienced across the country. The majority of Africa's continue to live in rural areas where a life of smallholder subsistence agriculture, lack of access to basic needs such as food and water entrenched many people in poverty (Wood, Dixon & McCartney, 2013; Mashamaite, 2014). Many areas in South Africa, people are directly dependant on wetlands for subsistence use, therefore there is a great need to assess and predict the sustainability of different land-use options in wetlands (Adams, 1993). McCartney, Morardet, Rebelo, Finlayson and Masiyandima (2011) notes that the conservation of wetlands is critical as wetland has the capacity to provide a diverse range of functions and services that have supported people, ecological systems and the physical environment. The drought season has

**Figure 1: Polluted Wetlands**

Source: Wetlands & Rivers Sustain Us, Chadwick (2015)

highlighted existing vulnerabilities in South Africa's water system, and properly frames the magnitude of the challenge of ensuring water security for the country. South Africa's water security depends on the sustained supply from our water resources, these are the natural capital on which all our investments into the water sector depend. Many rural communities are solely dependent on groundwater for their water supply; rivers, wetlands, estuaries, springs and aquifers are all water resources from the natural environment, replenished by rainfall (WWF, 2016). Wetlands have a critical role to play in supporting and developing people's livelihoods, reducing poverty, improving food security and in the wider context contributing towards sustainability. As in many African rural areas, many researchers such as Tapela (2015) and the WRC report (2016) highlighted that natural resources are generally managed according to locally derived rules and norms, or a blend of local and statutory systems. However, whilst this has been well recognised and documented in terrestrial systems, the discourse on freshwater systems such as wetlands, lakes, and estuaries is surprisingly inadequate. Water is a limited natural resource and a public good fundamental for life and health. The human right to water is indispensable for leading a life in human dignity. In the Limpopo basin, it is estimated that 3% of the total land area is under wetlands (World Resources Institute, 2003). Swamps and floodplains are the most widespread type of wetlands in the region. The relationship between communities and wetland continues today as provisioning services are increasingly developed and as wetlands play ever more important roles in livelihoods diversification in the face of

challenges to traditional livelihoods emerging from population growth and climate change.

Drought is one such extreme physical process and is often characterised as a slow-onset natural hazard whose impacts are complex and reverberate through many sectors of the economy such as water resources, agriculture, and natural ecosystem (Botai, Botai, Dlamini, Zwane & Phaduli, 2016). Wetlands can play a great role in mitigating hazards, especially those associated with drought, floods and veld fire (Belle, Collins & Jordaan, 2018). Despite their values, wetlands are very fragile ecosystems threatened by human interventions (Jogo & Hassen, 2009). Wetlands are constantly adjusting to disturbances occurring within them and within the surrounding landscape caused by the growth of urban and peri-urban areas, and results in declining water quality (Cullis, Rossouw, Du Toit, Petrie, Wolfaardt, De Clercq & Horn, 2018). Cullis *et al.* (2018:464) stated that "As populations continue to grow the water quality risk increases rapidly, not only because of an increasing pollution load, but also because of the associated increasing demands for water, which reduces the potential for dilution as well as the degradation of critical ecological infrastructure such as wetlands, riparian vegetation and buffer strips". Poor maintenance of existing water and wastewater treatment infrastructure, particularly in the poorer, rural and peri-urban areas, aggravates the situation. The most significant impact factors are pollution (54%), biological resources use (53%), natural system modification (53%), and agriculture and aquaculture (42%). The below picture depicts the threat that pollution poses to our wetlands. See Figure 1 above.

## 2. Conceptualisation of Wetlands, Livelihoods and Water Security

The nexus between water, food and energy is one of the most fundamental relationships and challenges for society (TEEB, 2013). Wetlands are indispensable for the countless benefits or "ecosystem services" that they provide humanity, ranging from freshwater supply, food and building materials, and biodiversity, to flood control, groundwater recharge, and climate change mitigation. The South Africa National Water Act (1998) defines a wetland as Land, which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or land that is periodically covered by shallow water and which in normal circumstances support or would support vegetation that is typically adapted to saturated soils. Wetlands are areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed six meters (Ramsar, 1971). Wetland is a generic term for all different kinds of habitats where the land is wet for some period of each year but not necessarily permanently wet (Nacelle, 2005); therefore, the term wetland refers to the aquatic systems that can be permanently saturated as well as areas that occur at other extreme. The ecosystem services that they provide include flood and storm surge protection, groundwater recharge, and drought mitigation.

Wetlands play a significant role in the livelihoods of rural communities in southern Africa (Jogo & Hassan, 2010). A livelihood comprises the assets (natural, physical, human, financial and social capital), the activities, and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household (Ellis, 2000). Therefore, this paper defines livelihoods as systems people use to sustain themselves. Livelihoods may include the economic value of the main provisioning services provided by the wetland collection of edible plants, crop production, livestock grazing, fishing, hunting, fuel-wood, reeds, and sedge collection. Most of the materials harvested from the wetland are used for household subsistence and are rarely sold. In addition to their economic and livelihood value, the wetland services are also essential to sustain the social and cultural responsibilities in gift giving to neighbours and relatives. Water security is defined as "the reliable availability of an acceptable quantity and quality of

water for health, livelihoods and production, coupled with an acceptable level of water-related risks" (Grey & Sadoff, 2007).

Water security is concerned with the ability to provide an appropriate quality and quantity of water reliably and affordably for human activity to the ability to cope with water related hazards, prevent harm to ecosystems and assure equity of access and minimize conflict (Lall *et al.*, 2017). Due to increasing human population, the exposure to water-related climatic hazards and the degree of pollution of water increases. According to Bakker and Morinville (2013), water security is an acceptable level of water-related risks to humans and ecosystems, coupled with the availability of water of sufficient quantity and quality to support livelihoods, national security, and human health and ecosystem services.

## 3. Wetlands Typologies and Contributions to Rural Livelihoods in the Limpopo Province

Wetlands cover a wide range of habitats from freshwater marshes and wet meadows to estuarine mangroves and swamps (Kotze, 2008). Baleni Spring is an intermittently hot spring and wetland that lies near the Letaba River under the authority of Chief Muhaumani. The 'Baleni Spring' site actually consists of two components: the hot spring, which lies in a wetland, and the salt making activities next to the Klein Letaba River. Salt is produced by filtering soil that has bathed in the spring overflow. Fresh river water is used to filter out the salt, and then evaporated over a fire to produce salt in compacted lumps. Baleni is a sacred place used in pursuit of the affirmation of cultural identity, as an inspirational point for healing, creativity, and religious worship. It has been used for a long time, apparently, its use can be traced back to 300 AD (promotional museum material). Only Tsonga women can produce the salt, and use it for barter and trading. It is highly sought after by traditional healers.

Mutale Valley wetlands have affected the rural livelihoods and natural resources of people living in the Mutale Valley. The wetland is recognised as the main access to key resources of land and water, although the user focus is on access to water for irrigation purposes. The Mutale River rises in the Soutpansberg range, close to Lake Fundudzi, and flows into the Luvuvhu River just inside the Kruger National Park. The Mutale River valley lies almost entirely within the former 'homeland' of Venda.



Some 8600 people live in the area. The principle of natural resource use in irrigated agriculture and livestock grazing. The most recent change has been the intensification of irrigated agriculture with water sourced from the Mutale River.

The Ga Mampa wetland, a palustrine wetland, comprises less than 1% of the catchment but is widely believed to make a significant contribution to dry-season river flows in the Mohlalapsi River, a tributary of the Olifants River, in South Africa (McCartney *et al.*, 2011). It is approximately 1km with a catchment of approximately 40,000 hectares (Kotze, 2005). There are two main villages in the valley: Ga-Mampa and Mantlhane. Each main village has a headman (Induna, the traditional head of the people), who is responsible for allocation of communal land among the community members and gives authorization for harvesting natural resources within the wetland. The valley is surrounded by nature reserves of which the local population uses natural resources for their livelihoods (fuelwood, grazing lands, hunting area, wild plant collection), although it is not legally authorized. Three small-scale irrigation schemes built-in 1959 by the former homeland government used to contribute to a large part of the local food production. After the withdrawal of government support in the mid-nineties and the 1995 and 2000 floods, the infrastructure has deteriorated and large parts of the schemes are no longer in use. Following the collapse of irrigation schemes, and attracted by wetland wetness and rich soils, farmers have converted half of its area to agriculture over the last decade.

#### 4. Wetlands Benefits in the Rural Livelihoods

Wetlands are the basis of food security and nutrition, provide the resources for drinking water and sanitation, and are essential in controlling water-borne diseases. Good management of wetland resources provides opportunities for improving economic activity and human health, thereby making a lasting contribution to poverty reduction. The significance of the diversity of activity in wetland livelihoods and the cultural importance that this represents has largely been overlooked in national development strategies. Diversity allows people to minimise risks to their livelihoods and maximise the benefits the environment offers. Communities in these areas are often repositories of natural resource knowledge that will be lost if their ways of life are irreversibly damaged.

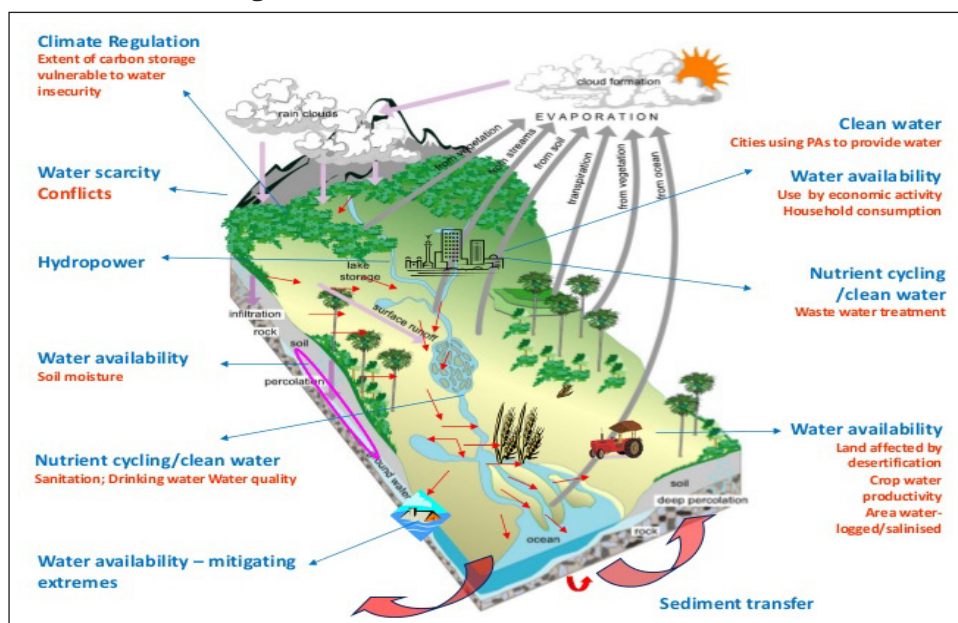
Freshwater is a vital resource for human health, prosperity, security, crucial for sustainable development, including poverty eradication, gender equality, food security and the preservation of ecosystems, among other critical issues. Wetlands provide a variety and valuable ecological services to the local communities and these services are normally grouped into provisioning, regulating, cultural and supporting services (Belle, Collins & Jordaan, 2018). The 'goods and services' supplied by these aquatic ecosystems range from flood control, to water quality amelioration, to provision of fish and building materials (Maltby *et al.*, 1994; Kotze *et al.*, 2008a). The CBD Brief (2015) summarised the benefits as follows:

- In addition to direct benefits, rural communities also obtain indirect benefits from wetlands that is depicted in Figure 2 on the following page, amongst the indirect benefits are water purification, sediment retention and flood attenuation (Owethu-Pantshwa & Buschke, 2019).

#### 5. Water Security and Wetlands in Limpopo Province

Water security means addressing environmental protection and the negative effects of poor management, which will become more challenging as climatic variability increases. A water-secure world reduces poverty, advances education, and increases living standards. It is a world where there is an improved quality of life for all, especially for the most vulnerable usually women and children who benefit most from good water governance. The UN Millennium Declaration and the World Summit on Sustainable Development pledged to halve the proportion of people without access to safe drinking water by 2015 (United Nations, n.d). All this, however, has largely focused on water supply for personal and domestic use. At the international level, much less attention has been paid to access to water for agriculture – broadly defined here as including crop production (farming), livestock rearing and other activities to produce food with natural resources. Access by the poor to natural resources: land, forests, water, fisheries, pastures, and wetlands, is essential for sustainable poverty reduction. The livelihoods of rural people without access, or with very limited access to natural resources are vulnerable because they have difficulty in obtaining food, accumulating other assets, and recuperating after natural or market shocks or misfortunes (Oguduvwe, 2013; Baumann, 2002). South

Figure 2: Indirect Benefits of Wetlands



Source: The Economics of Ecosystems and Biodiversity for Water and Wetlands (2013)

Table 1: SPI in June 2015 for Each Province

| Provinces     | 12-month SPI | Description                    |
|---------------|--------------|--------------------------------|
| Eastern Cape  | -0.30        | Dry conditions                 |
| Free state    | -0.6         | Dry conditions                 |
| Gauteng       | -1.2         | Moderate dry conditions        |
| KwaZulu-Natal | -2.45        | Exceptional drought conditions |
| Limpopo       | -1.34        | Severe drought conditions      |
| Mpumalanga    | -1.45        | Severe drought conditions      |
| Northern Cape | -0.60        | Dry conditions                 |
| North west    | -1.4         | Severe drought conditions      |
| Western cape  | -1.4         | Severe drought conditions      |

Source: Report on Drought Conditions across the Country (2015)

Africa is a water-scarce country; it ranks as one of the 30 driest countries in the world with an average rainfall of 40% less than annual world average rainfall. This situation has led to water shortages in a number of public water supply schemes and dams. By the middle of November 2015, disaster drought was declared in the KwaZulu-Natal, Free state, North-west and Limpopo. A severe drought, related to El Niño, is ongoing across the Southern Africa region. This drought has limited crop production and exacerbated the current lean season. Due to prolonged lower-than-normal rainfall, since the year started, drought conditions are being experienced across the country. This has led to water shortages in a number of public water supply schemes or dams. Limpopo province is one of them that are experiencing severe drought conditions.

Table 1 above shows the 12-month SPI values for the different provinces and illustrates the SPI values for June 2015 for each of the provinces. As per the drought indicators in Table 1, an SPI of -0.5 to -0.7 results in dry conditions and an SPI of less than -2 could result in exceptional drought conditions. The table indicates the exceptional drought conditions being experienced in KwaZulu-Natal, the severe drought conditions experienced in the Limpopo, Mpumalanga, North West and Western Cape provinces, the moderate drought condition in Gauteng, and the dry conditions in the remaining provinces. Wetlands are of strategic importance; they typically constitute the basis for the livelihoods of multiple resource users. In seasonally flooded plains, fishers and farmers may use the same area of land/water in different seasons. Herders may come to the area

### Box 1: Key Aspects of Water Security

- Access to safe and sufficient drinking water at an affordable cost in order to meet basic needs, which includes sanitation and hygiene (cf. United Nations General Assembly, 2010), and the safeguarding of health and well-being;
- Protection of livelihoods, human rights, and cultural and recreational values;
- Preservation and protection of ecosystems in water allocation and management systems in order to maintain their ability to deliver and sustain the functioning of essential ecosystem services;
- Water supplies for socio-economic development and activities (such as energy, transport, industry, tourism);
- Collection and treatment of used water to protect human life and the environment from pollution;
- Collaborative approaches to transboundary water resources management within and between countries to promote freshwater sustainability and cooperation;
- The ability to cope with uncertainties and risks of water-related hazards, such as floods, droughts and pollution, among others; and,
- Good governance and accountability, and the due consideration of the interests of all stakeholders through: appropriate and effective legal regimes; transparent, participatory and accountable institutions; properly planned, operated and maintained infrastructure; and capacity development.

Source: Ministerial Declaration of The Hague on Water Security in the 21<sup>st</sup> Century (2000)

during the dry season, in search for green pastures for their herds. The complexity of competing livelihoods strategies and overlapping use rights matches the complexity of the ecosystem. Groundwater is much slower to be affected by drought than surface water, and worldwide groundwater has proved to be a good buffer against drought. Tackling South Africa water security will require addressing the technical deficiencies, governance gaps and social inequality that are currently having a dangerous and environmentally devastating impact. The discourse on water security in recent years contains a number of common, key elements to water security. Box 1 above is a summary of the core elements necessary to achieving and maintaining water security, as found in a broad range of published definitions?

## 6. Conclusion and Recommendations

South Africa has low levels of rainfall relative to the world average, with high variability and high levels of evaporation due to the hot climate, and increasing challenges from water pollution (Schreiner, Mungatana & Baleta, 2018). Wetlands are essential in providing water-related ecosystem services, such as clean water for drinking, water for agriculture, cooling water for the energy sector and regulating water quantity (TEEB, 2013). All life in the water is dependent on the interaction within the river itself and in the surrounding catchment. It is clear that a failure to maintain acceptable water quality standards in our wetlands it will have a significant negative

impact on the local economy. Healthy streams, wetlands and rivers support a great variety of water life.

- Restoring our wetlands area with natural vegetation, limiting agricultural activities and developing a comprehensive wetland management plan;
- To explore the diversification of food production towards more drought-resistant crops and varieties;
- To invest in climate resilience and early actions with more appropriate infrastructures and information systems.

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