

Entrepreneurship Summit 2020: The Important role of groundwater and springs in Mpumalanga Province's rural water area water supply: The Case study of two communities in the Bushbuckridge Municipality: A Review Paper- Hluphi Constance Mafuwane, Tshwane University of Technology, South Africa

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Review Paper

Every day a child is born in South Africa, from a rural community, which means communities will require more water as it grows. Rural areas are growing very fast. According to WWF (2013) South Africa is a water-scarce country with uneven distribution of rainfall. Our mean annual rainfall is 490mm. This is only half the global average. Further, high evaporation rates result in less than 9% of the rainfall ending up in our rivers. South Africa made considerable investments into engineered infrastructure (including dams and inter-basin transfer schemes) in the 1930s, 70s and 80s (WWF, 2013). South Africa has 22 water source areas spread across five provinces (KwaZulu-Natal, Mpumalanga, Western Cape, Eastern Cape and Limpopo). The total size of our water source areas is 12.32 million hectares. A number of these areas extend and are shared with Lesotho and Swaziland; approximately 1.91 million hectares in Lesotho and 0.93 million hectares in Swaziland. The following water sources are found in Mpumalanga namely Mpumalanga Province: Mpumalanga Drakensberg Nkangala Drakensberg Mbabane Hills Upper Vaal and Upper Usutu (WWF, 2013). Groundwater is a key renewable resource all over the world, valuable for human life and economic development. It constitutes a major portion of the Earth's hydrologic cycle and occurs in permeable geologic formations known as aquifers. These aquifers have a structure that can store and transmit water at rates fast enough to supply reasonable amounts of water to water wells. Groundwater's importance stems from its ability to act as a large reservoir of water, providing 'buffer storage' during periods of drought. According to WWAP (2009), groundwater supplies almost half of the world's drinking water and plays a key role in food production,

accounting for over 40 per cent of global consumption of water for agricultural irrigation (Siebert et al., 2010). Groundwater Governance (2013, cited in Zhou et al., 2015), stated that the last few decades have witnessed an increased pressure on groundwater resources globally, which has in many cases induced abstraction beyond sustainable levels and increased levels of pollution. The financial human and ecological impacts of global and local changes to climate are already evident in South Africa, particularly where water resources are under the greatest pressure Schulze, (2005). Groundwater is the importance water resource to be used to supplement water demand in Bushbuckridge for our future generation.

Between 2016 and 2050, the urban population of Sub-Saharan Africa (SSA) will increase from about 40% to nearly 60% and is projected to exceed 1.26 billion (United Nation, 2012). Studies conducted by (Gromwell, Mulenga & McGranahan, 2010) stated that residents are focused to self-supply water from wells, surface water, vendors and illegal connections to the mains distribution system. In the economic context, it is also important that water companies make assessments of the strategic value of their groundwater sources. This should be based on a realistic evaluation of their replacement value, including the cost of developing the new supply source. Safe drinking-water from centralized distribution systems rarely meets demand in these settlements. According to Seward (2010), the implementation of novel groundwater policies in South Africa needs a right balance, between simple concepts which are easily communicated to stakeholders, on

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the one side, and management approaches that are theoretically established but not always easy to comprehend, on the other side.

For many rural residents, groundwater is a vital domestic water source because of its affordability and availability, but rapid population growth, unplanned land development and climate change are putting it under increasing strain. The magnitude and locations of those affected remain unclear, but an estimated 41.4 million people in urban Sub-Saharan Africa use non-piped 'improved' sources, a source class that includes protected wells and boreholes (WHO-UNICEF., 2014). Safe water provision to the urban poor remains an international priority, given the emphasis on reducing inequality in safe water access in post-2015 monitoring (WHO-UNICEF., 2013), and a national goal in strategic plans across Sub-Saharan Africa .

RATIONALE OF STUDY

Aurthurseat and Green valley communities in the Bushbuckridge municipality of Mpumalanga Province have a problem with water delivery. The water taps that have been installed on the streets have been vandalized by the villagers. The village depends on water supply from privately owned boreholes for survival where they pay R3.00 for 25 liters of water for survival whereas there are other communities that receive water for free. The water challenges in Bushbuckridge are historical and are common to most poverty pockets of the province that emerged from the former homeland governments. These challenges are as a result of apartheid spatial planning patterns, where communities were settled on what was designed as farms without changing their land use. For municipalities like Bushbuckridge is it difficult considering the fact that most rural communities cannot afford to pay for services and have to receive services at no cost since most people survive on a social grant and farming.

As a water scarce country, South Africa must act urgently to protect water resources and ensure that what we have is used in the most efficient and effective way possible. It is important to recognize where water comes from, how to protect it along its journey to us and how to stop wasting it. This will need management and investment in the critical ecological and engineered part of our water cycle. The first point in the water cycle will be rainfall which becomes the river flow that is in our water source areas. The main challenge in South Africa

however is that the role of groundwater is often underestimated. In most cases water service planners are well aware of the potential of ground water; however they often disregard it and do not incorporate it into their water plans. As a result communities have been using the sources for decades without any monitoring programmers in place. Furthermore, not much information has been documented on the actual quantities of spring water used on a daily basis in rural communities. There is a critical shortage of studies that have been conducted so far with a view to assess and evaluate the degree of success achieved for the importance of groundwater and springs in the Bushbuckridge municipality in the Mpumalanga Province. This study is an investigation into all the water challenges facing the village.

OBJECTIVES OF STUDY

- To implement measures to prevent or limit the input of pollutants into groundwater and to prevent deterioration of groundwater.
- To protect, enhance and restore all bodies of groundwater.
- To determine accessibility of water services to the households in the Bushbuckridge municipality.
- To examine the groundwater quality to groundwater users
- To outline the current groundwater management strategies employed in Bushbuckridge rural communities
- To show the environmental and social-economic value of groundwater resources to local community.
- To provide recommendations for planners in relation to some of the approaches that could be implemented for effective management of groundwater

RESEARCH

The study aims to provide adequate answers to the following research questions:

- How to implement measures to prevent pollution into groundwater?
- Which ways to use to protect, enhance and restore all bodies of groundwater?
- What impact does the current water supply have in making rural communities?
- Is the current water supply enough sustains the rural communities of Bushbuckridge municipality?
- How much groundwater does Bushbuckridge municipality have?

Method and material of the study

The study will use both qualitative and quantitative methods to understand the use and role of ground water and springs in the two rural communities in Mpumalanga. This study will use structured interview questionnaires to allow for in-depth probing of the respondents. The study will entail face to face interviews in order for the researcher to arrive at qualitative primary information. All available old data in South Africa will be analyzed as part of the study. Interviews will be done with randomly selected households to find out if they understand the role that springs play in the water supply of the selected community's especially on the selected household. Descriptive data will be collected from past and present records. This approach entails a review of existing literature journals, Government and other institutional reports, internet, newspaper and articles. In case of documentation, secondary data will be collected through journals, academic books, Government legislation and other recent material.

Statically method of analysis

The study uses field experiments (an experiment that takes places in its natural setting) and Quasi –experiments. The quantitative statistical procedures such as structural equations, instrumental variables, two and three-stage least squares estimations, maximum likelihood estimation and Bayesian methods will be used for the estimation of factors that affect the long-term survival and viability of groundwater and springs in South Africa.

This study will ensure that participants operate from an informed consent. Respondents will be told the truth about the intention of the study and not be deceived. Participation will be on voluntary basis so that they may pull out anytime they wish. There will be no violation of privacy and respondents will be assured of their anonymity. This means that even if they were supposed to fill their names on the questionnaires, these names were not going to be published. Respondents will be assured that the information they provide will be treated confidentially.

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