

Sustainable Water Provision in Informal Settlements: A Developmental Challenge for Urban South Africa

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Abstract

Sustainable human development is premised upon the accessibility and availability of socio-economic services. Equally important is sustainable access to water, which is intrinsically a backbone to life's sustenance. Inevitably, every dimension of life depends on the availability of water, be it social, economic, biological, physical or environmental. Consequently, inadequate water provision and the proliferation of informal settlements have dominated the agendas of a variety of developmental initiatives. The amalgamation of the two phenomena gives birth to diverse urban challenges ranging from, amongst others, urban socio-economic fragmentation environmental pollution, deficient sanitation that manifests into poor health, to hazardous squalid living conditions within informal settlements. Despite the implementation of populous policies that seek to promote better water provision and equitable urban development in South Africa, water provision in informal settlements remains a hefty challenge. Theoretically, the paper demonstrates the relationship between water provision in informal settlements and the living conditions therein. It argues that sustainable water provision in informal settlements significantly determines the level of well-being and living conditions. Therefore, the paper makes a recommendation for the adoption and promotion of sustainable water provision in South Africa's informal settlements as a measure of improving the living conditions therein and reducing the urban socio-economic ills attendant thereto.

Keywords: Sustainable Water Provision; Urbanity; Informal settlements; Living Conditions; South Africa

1. Introduction

Globally, sustainable human development is premised upon accessibility and availability of basic services such as water provision (Tissington, 2012; Showkat & Ganaie, 2012). Access to water is, intrinsically, a backbone to life sustenance; hence, water is universally accepted as the panacea for sustainable human development (Butuala, Vankoooyen & Patel, 2010). Whereas water is a scarce precious natural resource, human beings cannot survive without it. Human life revolves around the availability and accessibility of water. For this reason, standards and conditions of living conditions in any human settlement are virtually determined by the availability and accessibility of water (World Health Organization, 2010). Informal settlements, which are unplanned by design, tend to experience an immense challenge on the provision of water resources. Inescapably, water provision in informal settlements tends to be unsustainable, with adverse effects on the standards and conditions of living therein. It is understandable that consideration of water resources is expressed at the global scale in terms of, among other instruments, the universal declaration of the International Drinking Water and Sanitation Decade campaign in the 1980s (Chigonda, 2011). The declaration invokes the notion of prioritization of access to water as a basic human right. The same universal consideration was emphasized through one of the Millennium Development Goals (MDGs), Goal 7, wherein target 10 aims to have the proportion of people without access to safe drinking water and sanitation halved between 1990 and 2015 (United Nations, 2006). Importantly, target 11 of the MDG Goal 7, embraces informal settlements in the hope of improving the lives of at least 100 million slum dwellers by 2020 (this includes increasing the proportion of people with improved sanitation and access to secure tenure) (UN, 2006). Additionally, 2005 marked the beginning of the "International Decade for Action: Water for Life", which signifies a renewed effort to achieve MDG Goal 7. However, progress on this front has been subjected to diverse forces, compromising the potential for attainment of the MDGs targets and goals. Such forces inexorably hinder sustainable human development; and, they include uncapped urbanization trends and the attendant proliferation of informal settlements. Although it was anticipated that by the year 2015 overwhelming improvements in water and sanitation accessibility would have been realized, an estimated total of about 884 million people in developing countries has continued to have limited or no access to clean water (Chigonda, 2011). Therefore, despite all the efforts geared towards extending access to water and sanitation, the latter remain one of the most daunting challenges relating to the realization of the MDGs and, by

implication, achieving sustainable human development.

This paper discusses how unsustainable water provision adversely affects living conditions in informal settlements; and, it is structured in the following manner: firstly, in order to demonstrate that the proliferation of informal settlements is not a new phenomenon, a global overview of how this occurrence is compromising the effectiveness of water provision is presented. Secondly, the paper delves into the challenges of water availability and accessibility within the context of the South African urbanity in order to flag symptoms of unsustainability of water provision in informal settlements as well as the potential for deleterious effects on living conditions, leading to poverty, ill-health and a hazardous environment. Thirdly, the paper explores the plausible strategies and approaches that could be adopted to enhance sustainable water provision in informal settlements. Lastly, the paper concludes that the squalid living conditions in informal settlements can be attributed to the unsustainable water provision therein.

2. The Challenge of Unsustainable Water Provision on Living Conditions in Informal Settlements: An Overview

Water scarcity problems and inadequate provision have dominated the agendas of a variety of developmental initiatives (Winayati & Heracles, 2004). Essentially, the provision of water has attracted attention of researchers and development policymakers across the world (Rheingans & Moe, 2006; Cheru, 2011; Chigonda, 2011; Messinge, 2012; Brunt & Penelosa, 2012). Some performance indicators, ranging from the status of municipal water assets and systems to the quality of water services in terms of coverage and reliability as well as the environmental conditions in settlements, show that urban areas perform poorly with respect to water provision and management (Amber & Rasdale, 2008). It is estimated that in African cities, individuals require 20-50 liters of water to ensure that basic needs of drinking, cooking and washing are met (Rheingans & Moe, 2006; Ahkbar, Minnery, Hore & Smith, 2007; Practical Action, 2010; Messinge, 2012). That volume seems to be a reasonable requirement to be met; in practice, though, water provision in informal settlements remains precarious. The situation of the deteriorating water and sanitation services is of great concern in the developing world and South Africa is not an exception. The demand for water in South Africa's urban areas is increasing due to high urbanization rates elicited by rural-urban migration (Showkat & Ganaie, 2012). Given the complexities of the morphology of informal settlements, the extraordinary growth in urban population with spill-over effects of the proliferation of informal settlements, requires an effective water services systems that can be adopted to improve the conditions of living.

Regarding sustainable access to water, Africa has the least water and sanitation coverage (Golding, 2010). Records indicate that an estimation of at least 1 in 3 Africans residing in urban areas do not have adequate water services and facilities (Kujinga, Vanderpost, Mmopelwa & Piotr, 2010). Detailed records on inter-regional differences indicate that Africa has the lowest proportion of households in urban areas that have access to piped water (38.3%), whereas Latin America and the Caribbean have the highest (89.3%) (Loris, 2012). This African scenario is attributed to a number of factors, including structural difficulties, weak institutional arrangements, inadequate human resources' working capacities, lack of political will, poor community participation and lack of competitive policies and strategies (WUP, 2003; WOP, 2009). Most policies in developing countries tend to be mere blueprint dogmata that often fail to address the pragmatic developmental problems and issues facing citizens. There is a general premise that developing countries have a tendency of assigning policy development consultants that do not have understanding of what happens at the grassroots level (Ahkmat & Khan, 2011). Moreover, consultants also have a tendency of adopting ideologies from the developed world to formulate policies for developing countries, which have proven to be incompatible with the institutional capabilities of the developing world. Apparently, there is a need for a paradigm shift in respect of water provision in developing countries, especially within informal settlements.

Overall, there is negligible progress in terms of water provision in developing countries (UN, 2006). Urbanization in developing countries has escalated tremendously since the mid-20th century. It is estimated that more than 50% of the world population live in urban areas (Brunt & Penelosa, 2012), most of which is resides in the unplanned informal settlements where living conditions are below the minimum standards. Additionally, living conditions in informal settlements are worsening and the effects are habitually felt by the poor urbanites who do not have sufficient access to basic public services. Informal settlements residents face poor prospects of sustainable water provision. Goldberg, Kula, Mhlasi, Ngali & Ngesi (2009), Chigonda (2011) and Messinge (2012) demonstrate that unsustainable water provision and services in informal settlements have meant that inhabitants do not have access to potable water pipes within households; instead, they utilize temporary communal taps which are often inconveniently erected at least 200 meters away from homesteads. Unplanned and unsustainable water provision negatively affects the sanitation conditions and it compromises the standards of living. Residents are then compelled to use either pit latrines or the bucket system or to rely on open-air defecation, which is a significant threat to health and the environment (Amao, 2012). In accordance with

the water conservation activists' notion of "water is life", it has to be accepted that water availability or, lack thereof, is intricately connected to all aspects of life and human development (Hirotugu & Umenai, 2002). Unavailability of water triggers numerous social ills, owing to poor sanitation and waterborne diseases (Showkat & Ganaie, 2012). Most death cases in informal settlements are caused by curable diseases. Dwellings in informal settlements are inadequate without proper ventilation (ACMS, 2012). Occasionally, left-over food is exposed to contamination over elongated period of time. Without access to sufficient water, these living conditions become dangerously unhygienic with the potential for outbreak of diseases such as cholera, schistosomiasis, dysentery, infectious hepatitis, diarrhea and typhoid. Additionally, the poor spacing in-between the dwellings results in over congestion, which is coupled with the lack of storm water drainage and open channels that are often flooded with human waste, resulting in a hazardous environment that perpetuates health ailments (Ackleman & Anderson, 2008). Apparently, Majuru *et al.* (2011) reveal that there is also a negative relationship between poor health and income. Informal settlement inhabitants commonly work in the semi-skilled labor sector and their wages are generally low. Poor performance at work inevitably leads to dismissal and/or suspension. Such a scenario links to poor living conditions, poor health and the high unemployment rates within informal settlements. Therefore, it can be argued that improved water provision directly enhances the living conditions in informal settlements. Note has to be made to the effect that the sustainability of water supply reduces morbidity and mortality.

3. Water Provision and Living Conditions in South Africa's Informal Settlements

South Africa attained its liberty from apartheid in 1994; and, as it gained some spur in its freedom discourse in 2008, government announced the Universal Water Supply Declaration, which sought to ensure equal access to water supply for all citizens (De Coning, 2006). However, the provision of water has remained a challenge because government had to tackle some disparities and legacies of apartheid, wherein 14 million and 24 million people had to be given access to water and basic sanitation, respectively, by the year 2010 (Carvalho *et al.*, 2009). Several instruments, such as the *White Paper on Water Supply and Sanitation Policy* of 1994, the national *Water Act 108 of 1997* and the 1996 *Constitution*, amongst others, were implemented in an effort to tackle the service delivery backlogs (De Coning, 2006). However, water and sanitation service delivery still remains a challenge, notwithstanding the halving of water service backlog in 2001 (Golding, 2010). Consequently, the slow pace of delivering water accessibility led to the postponement of the universal declaration on water supply to 2010; and, due to challenges relating to sustainability of water provision systems, the target date was shifted to December 2014 (Butterworth, Warner, Moriarty, Smits & Batchelor, 2010). South Africa is generally water scarce and is classified as an arid to semi-arid country, with an average rainfall of 450 millimeters per annum (Butterworth *et al.*, 2010). South Africa is classified as a "water-stressed" country because only about 1.1 million litres of water are available per person per annum. Estimations reveal that an average adult needs about 25 litres of water per day for drinking, cooking, washing and sanitation (DWA, 1994). Projections made by WOP (2003) reveal that water demand will surpass availability by 2025, if existing usage trends are maintained. Another key point to note, as highlighted earlier, is that South Africa is experiencing high urbanization and industrialization trends, and if these continue, further constraints will be placed on the country's water supply system. Given the scarcity of water resources in South Africa, together with the urbanization and industrialization trends, poor urbanites are the most vulnerable to the negative effects thereof.

The specific legislation that deals with water provision as stated before is the *White Paper on Water Supply and Sanitation* of 1994, which clearly states that an individual is entitled to a minimum of 25 liters of water per day for direct consumption through cooking and personal hygiene. Relating this minimum requirement to the conditions in informal settlements, water provision is far below the standards required. Additionally, legislation requires that a minimum distance that a person has to travel to access water should be 200 meters and in terms of availability, the flow rate out of the outlet should not be less than 10 litres a minute and it should be available always. Furthermore, the supply should provide water security for the community without any service interruptions. Evidently, the preconditions for water supply set forth by legislation seem to be unmet in informal settlements. For this reason, water supply in informal settlements is not reliable in terms of quantity, quality, availability and cartage. The question therefore remains whether the authorities for water supply are subverting the service in informal settlements due to reasons based on issues of security of tenure. Perhaps, concern rests with the technicality of service provision in such unplanned areas. However, legislation does not necessarily prescribe planning for household water connections, specifically in informal settlements. Water policy entails upgrading communal taps to meet the needs of all consumers and to avoid illegal connections which render available water systems unusable. Informal settlement inhabitants too have the legal right to sustainable water provision that can sufficiently meet their needs. As informal settlements continue to grow, living conditions therein have remained squalid. Currently, South Africa has about 2 700 informal settlements with 1.2 million households that are without adequate

access to basic services, especially water (HAD, 2012).

4. Strategies and Approaches for Sustainable Water Provision

The sustainability of water provision systems can be interpreted from two different viewpoints, which are: the consumer and the service providers' perspectives (Cheru, 2011). The consumers' viewpoint of sustainable water provision is based on the mode through which becomes justifiably disposable to them. Sustainability of water services for consumers is judged on the bases of the following criteria: accessibility, availability, reliability, convenience, quantity and quality (Cheru, 2011). The expectation of consumers, which is often unmet in informal settlements is that they should have equal access to water services, in the rightful quality and adequate quantity, which is the same as those in formal and planned settlements. However, informal settlements inhabitants tend to be susceptible to exclusion and alienation from service provision in that the water services available for them is devoid of proper planning and is ultimately unreliable, inconvenient and unsustainable. The unsustainability of the water services is affirmed by the poor quality or lack thereof, insufficiency and inadequacy in terms of meeting the bare requirement for survival. Conversely, sustainability of water provision is, from the perspective of service providers, is determined to a large extent by factors such as consumers' willingness to pay, together with revenue collection and cost recovery issues, infrastructure feasibility, water resources and land tenure. In this regard, the feasibility of water provision in informal settlements can be compromised due to the nature in which they are structured, without sufficient space to expedite any infrastructural and engineering facilities (Muzondi, 2014). Additionally, the drawback relating to the lack of security of tenure in informal settlements is that the formalization of land rights enhances the provision of public services by facilitating delivery of the relevant infrastructure. On the other hand, it is also discovered that informal settlement inhabitants tend to be unenthusiastic to pay for water services due to the fear of possible evictions. That alone triggers some sense of insecurity from the water service providers who should have some cost-recovery means to guarantee sustainability of the amenity. If security of tenure could be secured informal settlement residents too could gain confidence to pay for the services; and, affordable cost-recovery strategies can be adopted to maintain the sustainability of the water service provision.

The sustainability of water provision also calls for the adoption of proper service planning strategies and approaches (Wats, 2003). Such strategies should consider a wide array of factors that influence the efficacy of water provision in settlements. In the opinion of Goldberg *et al.* (2009), strategizing water provision entail consideration of the demographic and service information such as, the current population, the number of households, the number of residential consumer units, the incomes related to these consumer units, current levels of water service, current and expected consumption, the demand for services in terms of the willingness to pay, population growth, economic growth, growth in number of consumer units, level of service provided to residential consumer units and changes in income levels of residential consumers. All the afore-mentioned factors determine the level of achievement in terms of water provision and a holistic water provision planning approach/strategy could perhaps consider such aspects. In Rheingans & Moe's (2006) opinion, there are basically service strategies that can be embraced to improve water provision. Such strategies revolve on the ownership and operation of water supply systems; and, they include: *Public ownership and public operation*, whereby ownership of the water provision infrastructure is wholly in the hands of a public entity. In this case the central, regional and local government is responsible for the operation of the service system; *Public ownership and private operation*, commonly interpreted as the Private and Public Partnerships (PPP). This form of coalition can be achieved through leases and concessions in which a municipality has the authority to delegate the operation of infrastructure facilities and the responsibility of new investment within the water provision sector, including also passing the commercial risks, to the private sector; *Private ownership and private operation*, which gives full ownership of the infrastructure and operation of the water systems to the private sector.

From a poor urbanite's perspective, the public ownership and public operation could be regarded as the best option, because the public sector usually has the interests of the citizens at heart and it is customarily mandated by the constitution and law to do so. It is of paramount importance to note that this option will not exploit the poor consumers because it is not profit-orientated. Although this may be true, public services are nonetheless considered to be inefficient and unduly bureaucratic; importantly, they require a strong economic base to sustain services (Kujinga *et al.*, 2013). On the other hand, if the private ownership and private operation option could be adopted, scores of poor urbanites are bound to inevitably suffer because the private sector aims at maximizing profits. The PPP appears to offer a pragmatic option for informal settlements. This option would strike a balance between the public and private interests, thereby producing better results, wherein the quality and efficacy of the facility provided is satisfactorily in equilibrium with the economic sustainability of the service rendered. Another strategy that has recently gained popularity as a measure to improve on the sustainability of water services is the Integrated Water Resources Management (IWRM) (De Carvalho *et*

al., 2009; Butterworth *et al* 2010). Basically, IWRM seeks to ensure that the provision of water yields both economic and social values. The approach draws its strength from the ethical principle of equity in water service delivery. Accordingly, equity within the IWRM entails social justice and fairness. Additionally, water equity can be achieved through fair allocation, distribution and pricing policies. For example, in order to maintain water equity, most African countries use what they term the increasing block tariff system (Hirotsugu & Umenai, 2002). Such a system allows large volume consumers to pay more and the low volume consumers (usually the poor) to pay affordable rates. Ideally, the IWRM approach can be of effective use, regarding water provision in informal settlements because it exploits the dualistic scenario. Given the mushrooming of informal settlements, IWRM can accommodate the poor urbanites and enable them to have fair access to water services which they can afford. Perhaps, in order to tackle the disparities in urban water provision, IWRM is the ideal approach to adopt for enhancing better service provision in informal settlements, without compromising delivery to the middle and opulent classes. With attention to the sustainability of water supply systems in urban areas, De Carvalho *et al.* (2009) calls for the promotion of Sustainable Integrated Urban Water Management (SIUWM), which assesses socio-economic, political and environmental components. Essentially, SIUWM entails *Social* components, whose variables reflect social fairness and equitable resource distribution; *Economic*, which dictates that water management should encompass economically sound principles; *Political*, wherein democratic support and international stewardship are of importance; and, *Institutional*, which means that reliability and progress on service delivery should be prioritized. Basically, the SIUWM reinforces and complements the IWRM by promoting the sustainability of water management in specifically urban areas.

In an effort to address the challenges facing informal settlements with regard to infrastructure and service provision, most countries in the developing world have adopted the slum upgrading strategy (Ackelman & Anderson, 2008). The strategy is basically a program for intervention to improve basic infrastructure within informal settlements. Essentially, the strategy provides a set of 7 interventions which are: connections to a water supply for individual households; construction of underground sewage for individual households; installation of storm water drainage; provision of street lighting; stone paving of internal and approach roads; management of solid waste; and, delivery of toilets for individual households (Loris, 2012). The strategy seeks to promote *in-situ* upgrading and it is basically an approach that is specifically designed for improving service delivery in informal settlements. This paper proposes that the combination of the IWRM and SIUWM could enable municipalities in South Africa to make reasonable progress in ensuring non-disruptive sustainability of water services to informal settlements.

5. Conclusion

The proliferation of informal settlements has proved to be a challenge to the governments worldwide in terms of the escalating need for service delivery. This paper has established that sustainable water provision remains an intractable challenge in South Africa's informal settlements. Notwithstanding issues of lack of security of tenure, informal settlements have the right to water provision as stipulated in the *White Paper on Water Supply and Sanitation Policy* of 1994. Indeed, informal settlement inhabitants continue to be susceptible to squalid living conditions that are exacerbated by the lack of sustainable water provision. Living conditions in informal settlements are characterized by poor sanitation, hazardous environment, poverty and ill-health, which are all linked to the unsustainable water provision. Therefore, the paper concludes that sustainable water provision determines to a greater extent, the conditions of living in informal settlements. Thus, the paper recommends for the prioritization of sustainability for water provision services in informal settlements through a combination of the PPP, IWRM and SIUWM, together with the slum upgrading in order to enhance sustainable water provision in informal settlements. Possibly, living conditions could then be improved and sustainable human development realized. Therefore, the paper contends that enhanced water provision can be the first step towards improving living conditions in informal settlements.

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