

**ASSESSMENT OF ENVIRONMENTAL IMPACTS OF URBAN HOUSING INFORMALITY ON  
RESIDENTS: EXPERIENCES WITH WATER, SANITATION AND WASTE MANAGEMENT  
IN ALEXANDER TOWNSHIP**

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**Abstract**

The need to protect and preserve urban environments can never be emphasised enough given the essential role cities in general and housing in particular play in the people's lives be it physically, economically or socially. Although numerous studies have been conducted on informal settlements, particularly their causes, prevalence and general conditions, very little is understood about the impact of water, sanitation and solid waste conditions on residents. Interestingly, the struggles people face on a daily basis as they make efforts to access water, sanitation and waste management services are not well documented. This work therefore explored in detail the nature of relationships that are forged by service providers, the level of service provision and daily experiences of the residents of Alexandra. A case study research design and a qualitative research approach were adopted and applied to gather relevant and meaningful data using interviews of key stakeholders and the residents. The work extended the frontiers of existing knowledge by bringing to the fore new insights on the direct impact of poor state of water supply, deplorable sanitation and glaring inadequacies in municipal solid waste management on residents. First, temporary water storage facilities such as drums and buckets; a mechanism to respond to water supply challenges; results in small particles being formed at the bottom of the facility and if consumed they result in water-borne diseases. Second, the use of pit latrines and the bucket system as a response to poor sanitation in Alexandra has given rise to outbreaks of diseases that are related and caused directly by lack of proper sanitation. Third, the absence of waste disposal facilities and the erratic nature of waste collection services have forced residents to use open pits in their yards to dispose waste or have resorted to open fire burning of waste thus exposing residents

to risk of injury, poisoning and infection. Furthermore, uncollected solid waste obstruct storm water drainages, leading to the formation of stagnant pools of water, which in turn facilitate the breeding of mosquitoes and other insects in the Alexander informal settlement. This work concludes by recommending relevant stakeholders to support efforts of residents to improve their living environments and to adopt a collaborative approach to resolving the environmental challenges being faced in this informal settlement. Such an approach will give rise to massive improvements as opposed to piecemeal and disjointed interventions by different stakeholders.

## **Introduction**

Protection of the environment has become a worldwide important criterion in order to sustain human .However, environmental issues have been a concern for some time worldwide in developed, developing and transitional countries particularly in the urban centres of the developing world. Although quite a number of studies on informal settlements have been conducted on social conditions, economic and planning, little has been done on the environmental issues emanating from informality. Through the collation of information from a series of stakeholder interviews, a community consultation, a literature review, a database search and site visits to Alexandra, this paper identifies and describe a selection of environmental concerns occurring in Alexandra which include the state of water situation, sanitation and waste management. Despite the initiative to try better Alexandra through the Alexander Renewal Project (ARP) and other projects to try and resolve the current situation of Alexander, the township still remains largely a slum, with grossly inadequate water, sanitation and refuse removal services. Planning and development departments have enormous power to determine, in both the short and longer term, levels of environmental quality.

## **Background**

Living in informal settlements is associated, theoretically with the exposure to environmental problems (Castellano, 2009).The number of people in informality is rising in cities of South Africa. In conjunction with growing urban poverty levels, the major urban management challenge facing the cities is the rise in the growth of informal settlements (Connell & Lea, 2002). According to Jones (2012), there is a growing body of literature that indicates that informal settlements are now a permanent feature of the towns and cities. These settlements mainly formulate due to the increasing rates of population migration from rural areas to urban areas (Chand &Yala, 2008). According to Allan & Heese (2013) ,most migrants find themselves unemployed, living in one of the many hundreds of informal settlements on the periphery of

large metros, effectively marginalised from both access to economic opportunity, housing and services (Allan & Heese, 2013).

Although quite a number of studies on informal settlements have been conducted on social conditions, economic and planning, little has been done on the environmental issues emanating from informality (Waweru, 2005). According to Akca et al (2007), these problems affect everything, from the tiniest organism to the greatest country, and they vary according to living conditions, the structure of the sector or the geographic and socio-economic situation of the country: “the major environmental issues at a city level have to do with land use and transportation, the quality and availability of water and sanitation services, air quality, solid and liquid waste management, as well as noise and the aesthetic role of the environment” (Akca et al., 2007).

As far as informal settlements are concerned, overcrowding, inadequate housing, inadequate access to clean water and sanitation, growing amounts of uncollected waste, and deteriorating air quality are already serious problems in informal settlements and may worsen substantially if effective and timely action is not taken. These issues together constitute what has become known as the ‘brown agenda’, a central tenet of current urban environmental management (Wekesa, 2011). The brown agenda has been defined as the most immediate and critical environmental problem facing informal settlements in the South (Beall et al, 2012). However, with the above mentioned, as far as this paper is concerned the purpose of this research study is to explore the relationship of Johannesburg’s poor to the urban environment focusing on the state of water, sanitation and solid waste as far as the brown agenda problems are concerned in Alexander township.

### **Conceptual issues**

Environmental issues have been a concern for some time worldwide in developed, developing and transitional countries particularly in the urban centres of the developing world (Alvare et al, 2013). Proliferation of the informal settlements in developing countries is of great concern because it impacts negatively on the quality of life specifically on the living environment. The increasingly high profile of global environmental concerns from the 1980s, the urban agenda for developing countries has seen progressive shifts toward a focus on urban environmental issues, collectively termed the ‘brown agenda’(Akca et al.,2007). The most critical and immediate development issues facing cities of the developing world in informal settlements are those of water supply, sanitation and solid waste management, (Wekesa et al. 2011).

Below are definitions of the key terms in relation to the study:

#### Informal settlements

Informal settlements can be defined as “dense settlements comprising communities housed in self-constructed shelters under conditions of informal or traditional land tenure. They are a common feature of developing countries and they are typically the product of an urgent need for shelter by the urban poor” (Mason & Fraser, 1998).

#### Brown Agenda issues

The brown agenda issues can be defined as issues of safe water provision, sanitation, and drainage; inadequate solid and hazardous waste management, air pollution including uncontrolled emissions from motor vehicles, factories and low-grade domestic fuels (Allen et al., 2002). The brown agenda emerged as a matter of concern and debate because of a perceived lack of attention to the specifically urban environmental problems of the developing world mainly within informal settlements

#### *Water supply*

According to Goebel (2007), water supply is the provision of water by public utilities, commercial organisations, community endeavours or by individuals, usually via a system of pumps and pipes.

#### *Sanitation*

Sanitation means the prescribed minimum standard of services necessary for the safe, hygienic and adequate collection, removal, disposal or purification of human excreta, domestic waste-water and sewerage from household, including informal households (Davis, 2006)

#### *Waste Management*

The term ‘waste’ refers to materials which have ceased to be useful to the person who is producing it. In other words, it is a discarded or unwanted material.

## **Experiences on water, sanitation and waste problems in informal settlements**

According to Johannessen et al (2014), one of the largest risks to people living in informal settlements in the developing world is the lack of improved water and sanitation. Especially, the state of sanitation is a global crisis, and addressing the Millennium Development Goal (MDG) for sanitation is lagging significantly behind the other goals (Roma et al, 2010). Sanitation and water supply are often inadequate in cities in developing countries like Cameroon (Brocklehurst et al, 2005). Therefore, as a result, many low-income urban communities in these countries rely on groundwater from shallow aquifers for drinking and other domestic purposes (Roma et al, 2010). These communities also usually constitute the high density and low income urban poor population that live in shattered informal settlements with deplorable housing and inadequate basic service infrastructures for sanitation, waste disposal and piped water supply thus affecting the environment (Delvoie 2005).

With the above mentioned, Kibera is the largest and most densely populated informal settlement in subSaharan Africa. With an estimated population of at least 500,000, the informal settlement of Kibera is home to at least a quarter of the population of Nairobi (Brocklehurst et al, 2005). In the informal settlement of Kibera in Nairobi, Kenya, more than half a million poor people have little or no access to the utility water supply. Instead, their demand for water is met by a burgeoning informal water market in which more than 650 local entrepreneurs sell water through kiosks scattered throughout the settlement

Furthermore, according to Brocklehurst et al (2005), some Kibera slums dwellers use sewerage and water from the river for bathing and washing. They also use borehole, rainwater, and sometimes draw water from broken pipes. This water is highly contaminated and filthy especially when plastic pipes burst and can potentially cause contagious diseases. For many years, Kibera slums has not had clean water points as most collected water comes from Nairobi dam (Rasnah, 2010). Moreover, along with population growth and rapid urbanization process, the volume of solid waste management within informal settlements in China has been increasing sharply in the past 30 years and the total amount of waste yields will continue to increase. Now more and more Chinese informal settlements are facing the predicament of being surrounded by waste yards which in turn affect the urban environment (Tiana et al, 2013). The urban population has reached to 669.8 million, and the ratio of urban population in China has increased from 19% in 1980 to 50% in 2010. Concurrently, the waste generation rate has increased from 0.5 kg/capita/day in 1980 to 1.1 kg/capita/year in 2010, over doubled during the past three decades.

## **Operationalising the study**

A case study research design and a qualitative research approach were adopted and applied to gather relevant and meaningful data using interviews of key stakeholders and the residents. The work extended the frontiers of existing knowledge by bringing to the fore new insights on the direct impact of poor state of water supply, deplorable sanitation and glaring inadequacies in municipal solid waste management on residents.

Methodology demonstrates the various procedures and strategies that were used in identifying different sources used. The research methodology approach adopted for this study is a mixed method approach that covers both aspects of qualitative and quantitative data

### Methods

- Previous journals and case studies done on informal settlements and environmental problems
- Field surveys , observations , questionnaires and interviews
- Sample size and content analysis
- Reports- City of Johannesburg long and short term intervention report and strategies in place for Alexander
- Newspaper articles. Relevant articles on environmental problems in informal settlements

## **State of water supply in alexander**

This study determined that 67 % of the sampled respondents use household standpipe to get their water, whilst 33 % respondents use public taps. With that said, it normally takes about 5 –10min of 33% of the respondents to fetch water from the public taps.

Below is a figure showing one of the respondents fetching water from a public tap

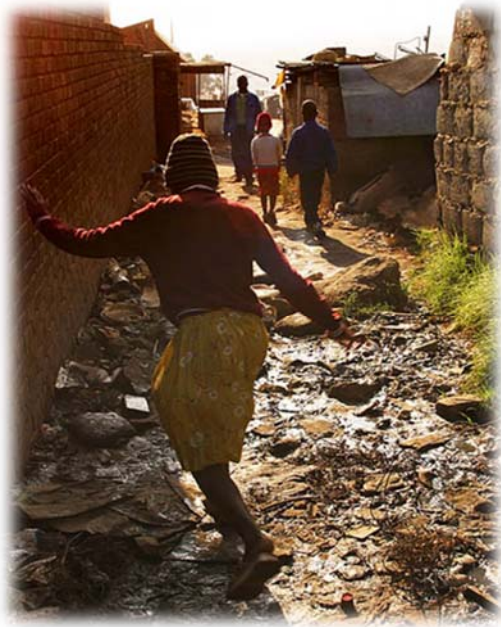


In informal settlement, water is usually collected from unreliable public taps and stored in drums and other storage facilities for domestic purposes (Kumar ,2005).This is the case in Alexander .Water is collected from street standpipes and stored in drums and buckets for easy access when it is needed. Due to the periods that water is stored in the storage facilities, small particles are formed at the bottom of the facility.

As a result, the biological make-up of water is compromised and the water becomes contaminated. Such water is not safe for human consumption as it has lost its quality. Over and above, 93 % of respondents in Alexander say that they don't treat the water before they actually get to use it. However 7 % of the respondents say that they treat the water and make it safe to drink by boiling the water. In addition, 7% of the sampled respondents rate the water supply condition to be bad, whilst 33% of the respondents say that the water supply is satisfactory and 60% of the respondents say that the water supply condition is fairly good.

Lastly, most of the respondents in Alexander say that the water supply conditions is not properly managed and the government needs to intervene to resolve the current state of water supply crisis. Most of the respondents say that inadequate water supply can result in water-borne .One of the respondents added on to say that: *“When one drinks water that is contaminated with coliform bacteria she/he is very likely to have diarrhoeal diseases and diarrhoea is the prime cause of infant mortality”*

Below is a figure of Pools of standing water in Alexander along piles of waste



### **State of Sanitation in Alexander**

Due to the lack of proper water supply within the informal settlements, there is no adequate sanitation (Staff 1993). This is also the case in Alexander. Pit latrines, chemical/ and bucket system is used as sanitation facilities. 67% of the sampled respondents in Alexandria have access to a flush or chemical toilet, whilst 25% of the respondents use pit latrines and 8% of the respondents use the bucket latrine. With that said, 83% of the respondents in Alexander say that they don't share the sanitation facility with other households whilst 17% of the respondents say that they share the sanitation facility, this shows that most households have chemical toilets inside their households.

Moreover, 10% of the respondents rate the sanitation facility to be good, whilst 22% of the respondents say that the sanitation facility is bad and 68% of the respondents say that the sanitation facility is very bad. With that said, most of the respondents in Alexander say that the quality of the sanitation in Alexander is very bad and not properly managed and the government needs to intervene to resolve the current state of the sanitation crisis. The respondents further complained that the spread of sanitation-related diseases occur



through a number of ways. They say that, ill health may be triggered through direct contact with faeces, when children, for example, put unclean fingers into their mouths, or indirectly, when bacteria or other organisms are transferred to food or water by agents such as insects, rodents and fomites.

General conditions of sanitation facility in Alexander. Most of the respondents in Alexander say that the quality of the sanitation in Alexander is very bad and not properly managed and the government needs to intervene to resolve the current state of the sanitation crisis.

Furthermore, visual observations in Alexander reveals that some of the people in Alexander share the sanitation facilities and the facility is indeed not looking good as seen in the below:



### **State of Waste Management**

Due to the lack of formal service provision in the informal settlements, there are no waste disposal facilities, nor is the waste collection facilities (Delvoie, 2005). This is the case in Alexander. In this regard, informal settlement populations use their waste management mechanisms to manage the waste generated. According to literature, informal settlements population normally use big tins or buckets to dispose waste and when full (Wekesa, 2011). In Alexander this case also seems to be prevailing. Households use their own sources like small pits that are dug in the yards to dispose waste. The residents dig small pits in their yards and dispose waste inside those pits and burn the contents when the pits are full. The waste dumps act as the breeding zone for pests and vectors of diseases.

However, 72 % of respondents in Alexander say that they use rubbish bins, 18% of the respondents use plastic and 10% respondents say that they use other mechanisms. Although households are supplied with plastic bags for waste disposal, many of these are left on the road and ripped open by animals. Some do not make use of bags and waste is illegally disposed of along streets and in other spaces. Most residents in

Alexander own their composting bins which accounts 82% of the respondents whilst 18 % of the respondents do not have composting bins.

Furthermore, 82% of the respondents say that the collection of waste is bad, whilst 18% of say that it is satisfactory and none of them have found the waste collection to be good. In addition, 65% say that illegal dumping in Alexander is very bad as waste is found everywhere even on the streets .Furthermore, 33 % of respondents say that it is found to be bad with only 3% of the sampled respondents finding it to be satisfactory.

With that said, most of the respondents in Alexander say that the general condition of waste management in Alexander is very bad and not properly managed and the government needs to intervene to resolve the current state of waste management. Lastly most of the respondents in Alexander say that, uncollected solid waste pose numerous risks to the local population. They say that young children are at risk of injury, poisoning and infection from waste in streets or local open space. They say that organic waste attract insects and other household pests, as well as animals. They further say that uncollected solid waste obstruct storm water run-off, leading to the formation of stagnant pools of water, which in turn facilitate the breeding of mosquitoes and other insects in Alexander informal settlement.

Below is a figure showing waste along the streets of Alexander



## Conclusions

Water supply problems, inadequate sanitation, littering and dumping of waste along the streets are the main problems experienced by the community of Alexandra. They live in cramped conditions and their houses are not in the best state of repair. The shacks are cramped together and water flows everywhere. An organised and clean environment is one of the most important things that guarantee good health and well-being of residents. Alexander Township is neither organised nor clean, thus the resident's good health and well-being is not guaranteed. There is no adequate housing within the settlement because the concept of 'adequate housing' includes access to safe water, sanitation refuse removal, and these are the things that Alexander Township does not have. Therefore, if no urgent intervention measures are put in place in addressing these housing environmental problems, there will be high levels of environmental degradation in the years to come in the community of Alexander.

Despite the initiative to try better Alexandra through the Alexander Renewal Project (ARP) and other projects to try and resolve the current situation of Alexander, the township still remains largely a slum, with grossly inadequate water, sanitation and refuse removal services. Planning and development departments have enormous power to determine, in both the short and longer term, levels of environmental quality. A drive or walk through the streets of Alexandra provides powerful support for the old adage that "prevention is better (and cheaper) than cure". Decades of bad planning and development decisions in the context of apartheid have left a legacy of environmental degradation and hazards to health and safety in Alexander, which local authorities and other stakeholders are now battling to address. Therefore further research as to why local authorities and other stakeholders are battling to address these housing environmental issues needs to be done.

## **Recommendations**

The quality of the living environment is well recognized to be a powerful determinant of community health status. Settlement planning and upgrading efforts, if the environment is to be optimised, requires holistic approaches and integrated input from a wide range of sectors and stakeholders, as well as investment from the state. Settlement upgrading initiatives are costly. To ensure that investments are directed towards interventions of high yield in terms of environmental quality, it is important that decisions are based on sound research and information, and that impacts are evaluated. In this regard, communities can play an important role. With the above mentioned, recommendations to try alleviate the current housing environmental problems in Alexander are given below:

### **Recommendations on the state of water supply in Alexander:**

- The current water supply state in Alexander is a deviation to Constitutional rights which in terms of water supply, the local government has to fulfil its Constitutional responsibility of providing access to water services to all because the South African Constitution, 1996, Section 27 states everyone's right to have access to sufficient food and **“water”**. Furthermore, it adds on to saying that the state must take reasonable legislative and other measures, within its available resources, to achieve the progressive realisation of each of the rights. Therefore the government needs to try to adhere to mandates of the constitution so as to improve the current state in Alexander
- The municipality needs connect household standpipes for those that have to walk long distances to fetch water from the public taps, this will help residents to stop storing water in storage facilities thus avoiding water contamination.

#### **Recommendations on the state of sanitation in Alexander:**

- Health education and hygiene awareness should be encourage in Alexander to better the current state of sanitation. (Promotion and health education are the key elements to achieve adequate sanitation.
- Ventilated Improved Pit (VIP) latrines are improved pit latrines which are recommended for Alexander as individual or public sanitation systems. VIP latrines cancel harmful side effects (smells and flies) related to traditional pit latrines. It is cheap comparing to other improved hygienic systems and can be accessed by the community, skilled labour are accessible since not complicated, it is easy to maintain and different types of cleansing materials both solid and water can be used.
- The city of Johannesburg should try fast track the provision of sanitation through the free basic household sanitation programme to those residents in Alexander who cannot afford to build their own sanitation facilities
- Monitoring mechanisms by the Municipality should be put in place as to ensure that residents in Alexander meet the minimum required housing standard of a safe sanitation facility.

#### **Recommendations on the state of solid waste management in Alexander**

The following will probably lead to a better or improved waste management system, enhancing the quality of life in Alexander Township .These recommendations are considered to be answering the part of the

research question which focuses on what the state of waste management is in Alexander informal settlement:

- For improving waste management in Alexander, there is a need for placing dust-bins in different points within the settlement. The points should be easily accessible by both solid waste collectors and local community. Waste from inaccessible locations should be collected in residential improvised bins including plastic bags.
- Residents in Alexander should be educated and encouraged to abide with the current by laws regulating waste management. This will help in regulating dumping of waste
- Education and awareness creation campaigns accompanied by community consultation can help to enhance willingness of the local community. This way, solid waste management, and particularly collection would improve tremendously.
- Collecting the waste on weekly basis can help reduce the establishment of waste dumps within the Alexander. This can help keep the environment clean.

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