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RESIDENTS PERCEPTION ON WATER AND SANITATION PROBLEMS IN DZIVARESEKWA 1 HIGH DENSITY SURBUB, HARARE

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ABSTRACT

The study was set out to assess the resident's perception on water and sanitation problems. Focus was on perception on water and sanitation problems in Dzivaresekwa 1 High Density Suburb, Harare. The main research instruments used in this study were the questionnaire, interviews and observation. A sample of 200 respondents, and the officials from City of Harare was drawn. Formal interviews were carried out to establish the Council position. Questionnaires were used to establish the perception of residents and also observations. The main findings were that problems of water and sanitation are rife in the Suburb. The majority of the respondents blame Central Government and the City of Harare for their problems. Various strategies like devolution of power, amendment to the Urban Councils Act and recapitalization of Zimbabwe Electricity Supply Authority need to be used so as to find a permanent solution.

Key Words: sanitation, water, perception, pollution

INTRODUCTION

Dzivaresekwa 1 is one of the oldest locations in Harare. Its origins can be traced back to the colonial era. It was a compound built by the then Salisbury Municipality to cater for black working people and was called Gillingham. According to the locals, the name was changed so as to do away with colonial names and they named it after a certain pool which was sacred and near it there was a medium spirit lived there called Sekwa. It was designed for fewer people, the sewer pipes carrying capacity is being exceeded due to present high population. Water is frequently cut because of insufficient water from local reservoirs which are not large enough. Despite water's central role in life and industry, many towns and cities still have unreliable piped water systems, with supply interruptions, high leakage rates and unaccounted for connections, especially in the developing world (Wegelin-Schuringa, 1999). Sanitation is compromised by the water shortage situation.

Water is one of life's necessities. It is needed in life supporting systems, for food production, economic development and enhancing human health (Mehta, 2001). Despite water's central role in life and industry, many towns and cities still have unreliable piped water systems, with supply interruptions, high leakage rates and unaccounted for connections, especially in the developing world (Wegelin-Schuringa, 1999). People who live in high density suburbs are mostly urban poor with low income, except for the few affluent people, a typical example of this is Dzivaresekwa 1 high density suburb. It is in view of

the above situation that a study such as this is made worthwhile. This chapter therefore, discusses access to water and sanitation for the urban high density residents, with emphasis on water quantity and scarcity, water quality, waste disposal and human health implications.

IMPORTANCE OF WATER AND GLOBAL SUPPLY SITUATION

In revealing the importance of water Falkenmark and Widstrand (1992) asserts that water is the life blood of the biosphere. At one level, water is essential for all life and environmental well being. However, water also plays an economic role in people's livelihoods, as a key productive resource, in particular, small scale water based economic activities are a vital part of the livelihoods of many poor people and women (Moriarty, 2001).

The Rio Earth Summit of 1992's Agenda 21 underlined the importance of water when it stated that "All people, whatever their stage of development and their social and economic conditions have the right to access drinking water in quantities and quality equal to their basic needs". On the other hand, the Water Resources management Strategy in Zimbabwe has noted that every human being in Zimbabwe, now and in future, should have access to adequate and clean water t an affordable cost to meet basic needs. These basic needs include water for drinking, food production and appropriate sanitation. It also notes that more than 30% of the people in Zimbabwe lack access to water of acceptable quantity and quality for drinking and sanitation, this has resulted in a situation where avoidable water related diseases are still prevalent resulting in high mortality rates. Water related diseases also significantly lower human productivity (NAC, 2003). About one billion people do not have adequate and safe water and about 2,4 billion lack adequate sanitation in the whole world (Wright, 2000).

International targets are now being reset, to be more realistic than before. The target is now to halve the proportion of people unable to reach or afford safe drinking water (Derevil, 2001). In several parts of the world, the water supply situation is not distributed evenly. Within countries and across regions, the distribution is not even. As a result, in quite a number of situations, it is not easy to calculate coverage that has been done. For instance, Derevil (2001) reported that water supply coverage in Nepal rural areas was estimated to be 50% and in urban areas 80% that was in year 2000.

POVERTY AND ACCESS TO WATER AND SANITATION

Water and sanitation problems are common to urban high density suburbs, especially the low income community. Previous studies which include those by the World Commission on Dams, WCD (2000), Schuringa (1999), confirm the above assertion. Schuringa's work in the slums of Kibera and Nairobi cities in Kenya showed that some people were not connected to treated council water supply, and that no proper waste disposal facilities were in place. An assessment by UNESCO (2003) in towns of Southern Sri-Lanka, the Trarza in Mauritania, Oniro, Puno and Juliaca in Peru and Copacabana in Bolivia revealed that populations in these poor communities are experiencing utter deprivation of safe water supplies and proper sanitary facilities.

Other studies by Morrish (1988) in Calcutta, Rio de Janeiro, Manila, Kinshasa and Lusaka consolidate the position that poverty is closely associated to water and sanitation deprivation. With reference to Calcutta, Morrish bluntly points out that

there is hardly any sanitation in that city. Several other researcher worldwide support the assertion that lack of adequate water and sanitation infrastructure is by and to a large extend a characteristic of poor, high density, low income communities (Ashkin, 1999) (Shirking, 1999), UNDP, 1992), (Littman, 1994). The aforementioned authorities postulate several reasons for the deprivation in the communities under discussion. For instance, poor members of a community have a little political clout such that they cannot articulate their concerns about environmental and other problems, nor can they successfully pressure solutions. In addition, the poor have the least economic ability to invest in environmental infrastructure such as piped water, skeptic tanks and flash toilets. Therefore they resort to poor alternatives such as shallow wells and pit latrines. Many of the urban poor have had little or not access to formal education or training. Thus they may have a low level of awareness about the causes and solutions of the environmental problems that affect them (leitnann, 1994).

According to Morrish (1988) poor communities are usually characterized by high pollution and overcrowding, which result from accelerated rural-urban migration.

QUALITY OF WATER SUPPLY

The problems of inadequate water supply in high density low income communities result in exposure to pollution, especially when people resort to digging shallow wells. May (199:51) defines water pollution as the "contamination of other alteration of the biological, chemical or physical properties of public water, including changes in colour, odour, taste, temperature and turbidity". Such alteration of water quality can result from discharges of gaseous, liquid and solid substances into water bodies. Emission of gases such as sulphur dioxide, carbon dioxide and phosphorus oxides from acidic solutions with water within lower pH level proportions intolerable to humans, livestock, animals, aquatic organisms and wildlife. Sewerage effluent discharges can increase concentrations of phosphates and nitrates that in turn result in algal blooms and eutrophication. That proliferation of water plants causes an increase of biological oxygen demand (BOD) which deprives aquatic animals of dissolved oxygen (DO), leading to deaths (Mukwada, 2000). Agricultural chemicals such as inorganic fertilizers and dichlodiphenyl trichloroethane (DDT) can contaminate water bodies with unfavourable health effects on humans and other organisms. Other chemical and bacteriological water pollutants come from household waste dumps that are precariously situated within communities. According to Nhapi et al (2000), pollution from waste dumps can be released to surface and underground water storage by overland flow, seepage, percolation or leaching. Urban agriculture also result in use of fertilizers and chemicals that are washed to pollute surface and underground water.

Morgan (1990) notes that many standards have been laid down for the quality of drinking water for urban areas. In these areas water is supplied by councils mostly by the use of pipes and tapes connected from reservoirs. Water from dams and aquifers like Nyamandlovu pumped to water treatment plants. However, due to water shortage in urban areas the more people drill boreholes at their homesteads and the poor dig hallow well near their homesteads or in low lying surrounding areas.

Nhapi et al (2002) noted that the quality of water extracted from the ground also varies with season. The lowest amounts for faecal contamination are found in the water in both protected and unprotected groundwater sources, with higher counts being

found in the warmer and wetter seasons (Morgan, 1990). According to Nhapi (2000), lack of access to safe water, inadequate sanitation and poor hygiene practices are responsible for the prevalence of preventable diseases in developing countries. According to WHO and UNICEF, in 2005, 4 billion cases of diarrhea are reported in the world every year, with 2,2 million deaths annually, mostly among children under five. Diseases caused by unsafe drinking water such as diarrhea and lack of proper sanitary facilities are common in the developing world with Africa being the hardest hit (Ohlsson, 1995).

ADEQUACY OF WATER SUPPLY

Instances of water shortages are not uncommon in urban high density suburbs. Several council authorities are failing to meet the 50 litres per day per person minimum requirement for consumption purposes (Gleick, 1996). Drastically low average figures for domestic water consumption in developing countries reflect not only lower income but also a huge backlog of unsatisfied demand (WCD, 2000). The commission purports that water consumption varies directly proportional to one's income level. Where water reticulation facilities are in place, shortages are sometimes attributed to incapacitated reservoirs coupled with effects of seasonality and inadequate rainfall patterns. Most urban councils have responded to these shortages by rationing available supplies, a move that has threatened health conditions of people of these poor communities. However, in communities where piped water is not available people have resorted to the digging of shallow wells, especially in unplanned settlements and slums. According to Overman (1968), well-sinking among other disadvantages poses danger of exceeding recharge rates of groundwater aquifer than can interrupt the hydrological cycle thus creating further shortages.

WATER SCARCITY IN GENERAL

Defining Water Scarcity

The 2006 Human Development Report, "Beyond Scarcity, Power, Poverty and the Global Crisis", (United Nations Development Programme, 2006). Considered scarcity from two points of view: firstly as a crisis arising from a lack of services that provide safe water and secondly as a crisis caused by scarce water resources. It concluded that the world's water crisis is not related to the physical availability of water, but to unbalanced power relations, poverty and related inequalities.

The United Nations (UN) – Water Thematic Paper on Water Supply (2006) defines water scarcity as the point as which the aggregate impact of all users impinges on the supply or quality of water under prevailing institutional arrangements to the extent that the demand by all sectors, including the environment, cannot be satisfied fully. It goes further to state that water scarcity is a relative concept and can occur at any level of supply or demand because scarcity can be a social construct, a product of affluence, expectations and customary behaviour or the consequence of altered supply pattern stemming from climate change. Mehta (2001) on the other hand contends that water scarcity be analysed both as a biophysical and an anthropogenic problem. Water scarcity as a biophysical phenomenon occurs when there are water shortages as a result of little precipitation. Water scarcity as an anthropogenic phenomenon is when there is sufficient precipitation but people so not have access to water because of human causes such as lack of financial resources of human capacity to harness water and make it accessible to consumers, hence the concept of manufactured scarcity.

Falkenmark et al (2007) distinguishes between four categories of water scarcity. The first category they refer to as demand-driven blue water scarcity, which is when demand is high in relation to the amount of water available. The second category is the population-driven blue water scarcity, which is when high population levels places pressure on the amount of water physically available, leading to per capita water shortages. The third category is the climate-driven blue water scarcity which is when insufficient rainfall means limited runoff and the last category is pollution-driven blue water scarcity where water can degrade to the point that it is unusable.

The concepts of demand-driven 'apparent' scarcity and population-driven 'real' water scarcity tend to dominate debates on blue water, as discussed below. Demand-driven apparent scarcity can be measured by examining how much water is being withdrawn from rivers and aquifers (known as the use-to-availability indicator). In line with this, in its 1997 comprehensive Assessment of the Freshwater Resources of the World, the UN set the withdrawal of 40% of the resource as the line that distinguished the situation of 'high' water stress from that of 'low-to-moderate' water stress (Falkenmark et al, 2007).

Population-driven 'real' water shortages are related to the number of people that have to share each unit of the blue water resource (known as the water crowding indicator). Nearly two decades ago, it was observed that population levels higher than 1000 people per flow unit of the resource (1 million cubic metres per year) indicate chronic water shortages (Falkenmark, 1989). This is commonly referred to as the Falkenmark water Stress Index (see table 2.1).
The water stress index states that humans require an estimated 100 litres/person/day for basic drinking, bathing and cooking. Five to twenty times this amount is needed to meet the demands for agriculture, industry and energy. Countries with over 1700 cubic metres of renewable fresh water per person per year will experience intermittent or localized water shortages. Chronic and widespread water scarcity occurs 1000 cubic meters (ibid).

The most widely used indicator, the Falkenmark Indicator, is popular because it is easy to understand. However, it does not help to explain the true nature of water scarcity (Rijsberman, 2005). Firstly, the figures refer to renewable fresh water and do not account for noon-renewable groundwater, timing, seasonality or adaptability of nations. Furthermore, it neither distinguishes between total run-off and available run-off, nor accounts for groundwater or water stored in lakes and dams (pallet, 1997, Gardener-Oullaw and Engelman, 1997). In addition, amounts above 1700 cubic metres do not assure an abundant freshwater supply at all times (ibid)

Table 2.1: Falkenmark's Water Stress Index

600 people per flow unit	Societies experience water problems associated with population and dry spells
Between 600-1000 people per flow unit	Societies are argued to suffer water stress
2000 people per flow unit	Societies would experience absolute water scarcity

Source: (Pallett, 1997)

Contrary to traditional belief that water scarcity relates water to food production, and not to water for domestic purposes that are minute at this scale (Rijsberman, 2005, Falkenmark and Rockton, 2000). Ohlsson and Burton (1999) contend that water scarcity does not only result from a physical lack of water. It is often also of difficulties in mobilizing more of the freshwater resources available. Such difficulties include cost, infrastructure related challenges, and the size of the population competing for the resource. Lack of social resources can also act as a bottleneck, preventing the water that is available from being efficiently mobilized and used. Falkenmark et al (2007) adds that lack of water in relation to water requirements is another issue that needs to be addressed. This can be caused by increases in demand, droughts, land degradation, population growth, emerging sectors of additional demand.

However, recent studies point to the fact that while the traditional measure of water scarcity have been per-capita water availability, it is now possible to begin to use data on actual human well-being. This has prompted the need to use the Basic Water Requirements of 50 litres per person per day as benchmark (Gleick, 1996). Domestic water scarcity in this view is when an individual has access to less than 50 litres per day to meet their basic water requirements, which should be of appropriate quality. Poor quality of domestic water is a severe and widespread problem, and it is likely that many people who may receive more than the recommended quantity are getting contaminated and unhealthy water (Gleick, 1996).
Falkenmark's water stress index is further critiqued by Postal (2000) who posits that the global hydrological cycle annually makes available several times more fresh water than is needed to sustain the current world population of 6 billion people. Because this water is not distributed evenly in time and space, however, much of it is not accessible for human use. Half of the 40 700km^3 of annual runoff, which equates with net precipitation on land runs rapidly off the land in floods. An additional one fifth of annual runoff is geographically too remote to be an economical source of supply. This leaves 31% of annual runoff, a figure that increases only as newly constructed dams capture and store additional floodwater (Postal et al, 1996).

Roy and Crow (2004) assert that water scarcity is determined by both the availability of water and by consumption patterns, which vary from one country to another or from one locality to another. For example, two countries could have the same amount of water resources but if one has high industrial demands or demands or large-scale agriculture, this country could face water scarcity while the other would not. On the other hand two countries can have the same amount of water resources but the absence of resources to harness the water from the source to the households cab result in domestic water scarcity. Thus, water scarcity results from a combination of physical factors and human activity.

Although it is difficult to disentangle the enumerable forces that are creating water scarcity for an increasing number of people, the fact that many rooted in socio-economics and politics means there is much hope for eradicating water scarcity by improving water management and distribution (Roy and Crow, 2004).

Scarcity of water acts as a constraint in economic development and also it limits the capacity to achieve self-sufficiency in food production. Consequently, scarcity of clean fresh water has depressed Human Development Indices (His) in the

developing world, particularly in Sub-Saharan Africa, where access to fresh clean water is limited by lack of capital and technological resources (Mukwada, 2000).

Household Water Scarcity in Urban Areas

In arid and tropical areas, source of water are scarce but the demand for domestic connections continues to increase in urban areas (Lee and Schwab, 2005). Owing to the scarcity of water as a resource and the fact that treatment plants were designed and built for populations much smaller than they currently supply (Ford, 1999). These water supply systems are not able to provide a continual supply of drinking water (Lee and Schwab, 2005).

The water supply system of Harare illustrates this point. Water quality problems in Harare have been attributed to the inadequate pumping capacity of Morton Jaffrey Works and Prince Edward Water Treatment Works (Manson and Maize, 2004), whose production capacity is 614 mega litres per day and 90 mega litres (ML) per day respectively (Mica, 1996). The actual respective productions are around 350ML per day and 250 ML per day respectively (Nhapi et al, 2002). The above-mentioned capacities are three quarters of what is required to meet the city's competing demands. To avert water scarcity in the city Nhapi et al, (2002) postulates that another water treatment plant should be developed to meet growing demand.
The water quantity problems encountered in Harare should be attributed to some extend to the deteriorating quality of water in Lake Chimera (Nhapi et al, 2004). Pollution reduces the uses of water can be put to use and in case of Harare increases the cost of purification for domestic use. Pollution in Lake Chimera has been traced to non-point sources of pollution and subsequent discharges of large volumes of partially treated effluent, domestic sewerage and industrial wastes from the City's waste treatment plants and the neighbouring town of Chitungwiza (Nhapi et al, 2004).

It is alleged that the frequently breaking down and overload waste treatment plants in Harare are inefficient and as such discharge effluent in a state that the natural environment cannot bear to self purify (Magadza, 2003). The resultant effect has been nutrient enrichment and subsequent overgrowth of algae and water hyacinth, which now covers 40% of the Lake Chivero surface (ibid). Madungwe and Sakuringwa (2007) observed that the secondary effects of water hyacinth invasion in the eutrophic Lake Chivero include increased cost for water treatment due to the poor quality of the water. Other problems include poor sedimentation, clogging of filters, disorder in colour, smell and taste, increasing pH, alkalinity and low turbidity. As a consequence, there has been a higher cost of purifying the water to drinking quality standards and reduced qualities available for the demanding users (ibid). The factors outlined above can be expected to cause domestic water scarcity. In developing countries intermittent supply has become the norm, rather than the exception (Kumar, 1998). WHO and UNICEF (2000) estimated that more than one-third of urban water supplies, operate intermittently. In Harare, Zimbabwe, water supply operations are interrupted by frequent backwashing necessitated by high concentrations of algae in raw water (Mckendrick, 1982, Nhapi et al, 2004). This is exacerbated by pumping problems, resulting in more high elevation areas like Mabvuku, Greendale and Tafara area receiving erratic supplies of water (Nhapi et al, ibid).

Sporadic water supply means that, most of time water is not provided to households, pressure in the system is drastically reduced and stagnant water remaining in the pipelines draws surrounding contaminants into the potable water supply (Ford,

1999). There is data showing that continual water supply is safer than an intermittent supply. Interrupted service has also linked to a number of disease outbreaks in the developing world (Lee and Shwab, 2005). In Jakarta, Indonesia, poor reliability of the water supply was most strongly associated with diarrhea illnesses such as cholera and dysentery (Alberini et al, 1996). In Dushanbe, Tajikistan, low and intermittent water supply was a causal factor for a typhoid outbreak (Mermin et al, 1999). Unreliable water supply systems influence the behaviour of those receiving the service, which may further exacerbate water supply problems (Lee and Shwab, ibid). Intermittent water supply creates a situation in which residents hoard water by establishing storage facilities when water becomes available (Manzungu, 2008). Health risks may also exist from the storage of water, as domestic or household tanks are often infrequently and in some cases inadequately cleaned (Geldreich, 1996; WHO, 1997).

Impacts of Water Supply Scarcity in Urban Communities

Rothert and May (2001) have put forward that many of the existing bulk and retail water supply schemes in Southern Africa are characterized by inadequate operation and maintenance, high levels of unaccounted for water, inappropriate tariffs as well as poor billing and revenue collection systems. This contributes to the inability of water utilities to expand their capital base so as to increase infrastructure to store and distribute water efficiently to current connected consumers and the unserved communities.

In Tanzania ownership and operation of water systems by government institutions have been blamed for poor water delivery systems mainly linked to lack of investment capabilities and incentives for maintaining efficiency and accountability in water resource use and management (Mwakalila, 2007). The resultant effect has been failure to expand service to the growing population. Noemdoe et al.., (2007) puts forward the concept of institutionally endured water scarcity which she argues is manifest in two particular ways; one, directly in terms of water resource management; two, less directly in terms of the overall legal setting for lad and water resource access, use and management.

Sadoff (2007) asserts that the reliable availability of an acceptable quantity and quality of water is a precondition for health, livelihoods and production. On a similar note, Sullivan et al (2003) contend that adequate water supply is not only a prerequisite for human development but also economic advancement. Water problems in conjunction with other factors such as poverty, have severe impacts on the human condition, particularly with respect to food security and health (Manzungu, 2008).

Improved water supply, sanitation and hygiene can be expected to have an impact on diarrhea morbidity, although the impact of the interventions has tended to vary widely between setting (Classen et al.. 2006, Fewtrell et al, 2005). Nonetheless, improving water supplies and sanitation as well as the promotion of personal and domestic hygiene have received the greatest attention worldwide as preventive strategies against diarrhea (Hutty, et al, 1997). Much emphasis has historically, gone into investigations related to effectiveness to achieve maximum public health impact (Kolsky, 1993; Feachem et al, 1983).

Water supply improvements also help to reduce a number of other infectious diseases. For example, water supply is an essential element in the eradication of Guinea worm disease, now confined to a few countries in the Sahel and West Africa.

There is also evidence that water availability helps control skin and eye infections, including blinding trachoma (Cairncross et al.., 2003). However, more than 90% of the burden of disease attributable to water supply is associated with diarrrhoeal diseases (White et al, 1972). In addition, Borghi et al, (2002), alleges that there is evidence that, where sufficient water is available to practice hygiene, the promotion of hygiene is argued to be a cost right. It is even more so when it accompanies water supply and sanitation (Varley, 1996).

Safe and adequate water supplies have benefits beyond health and they offer benefits to which a money value cannot be attributed (Cairncross et al.., 2003). A multi-country study by Water Aid (WA) noted that beneficiaries reported that special benefits of improved water supply included improved marital relations (WA., 2001). The saving time spent by households collecting water is typically half an hour to an hour per day. This time is mainly saved to women and is a significant contribution to women's emancipation. It makes it possible for women to devote more time to childcare, and there is evidence that this affects their children's nutritional status (Tomkins, et al, 1978). The UN Thematic paper on water scarcity (2006) adds that water scarcity has important gender related implications, it affects the social and economic capital of women in terms of leadership, earnings and networking opportunities.

Access to water for domestic and productive uses (agriculture, industry, other economic activities), has a direct impact on poverty and food security. Water scarcity impacts on both irrigated and rain-fed agriculture for expanded grain production, for subsistence agriculture, livestock, fish and other foods gathered in common property resources. This in turn erodes capacity to produce cheap food and consequently impacts on nutrition in urban and rural (UN- Thematic Paper on Water Scarcity, 2006).

Water Scarcity in Southern Africa's Urban Areas

As early as 1999, Africa had 11 water-scarce countries with renewable supplies of less than 750 gallons per person per day, a minimum benchmark for being able to meet food, industrial and household water needs while maintaining a health aquatic environment (Postel, 1999). By the end of this decade, four others will join the list, and the total number of Africans living in water-scarce countries will climb to 300 million, a third of the continent's projected population (Postel, ibid).

The importance of water provision is recognized both at national and international levels and is reflected in the global and regional commitments in the Southern Africa Development Community (SADC) (Dungumaro, 1997). Such efforts are exemplified by the United Nations Millennium Development Goals (MDGs). The MDGs have various targets among them is the water and sanitation target to reduce by half the proportion of people without sustainable access to safe water and basic sanitation (Dungumaro, ibid).

Ashton (2002) asserts that high rates of population growth in Africa accompanied by continued increase in the demand for water have resulted in several countries passing the point where the scarcity of water supplies effectively limits further development. Present population trends and patterns of water use suggest that more African countries will exceed the limits of their economically usable, land-based water resources before 2025.

At the regional level, much of the SADC region arid or semi arid and rainfall is variable and often unreliable (Chenje, 1998). The SADC region experiences regular wet and dry spells, that is, several years of abundant rain followed by periods of scarcity. In line with the above, Chiuta et al (1994) add that the distribution of fresh water resources in the SADC region is very uneven, and one consequence of this is localized water scarcities that affect economic development and social security. Chiuta et al (1994) projected that seven countries in the SADC region will be experiencing water problems by the year 2000. The countries included Botswana, Lesotho, Malawi, Swaziland and Tanzania. The same authors projected that South Africa and Zimbabwe by the same year will be water stressed thus having 1000mm available per person per annum and by 2005 South Africa will be facing absolute water scarcity. At present all these countries are experiencing population growth which is rapid, this is putting pressure on water resources. Countries like South Africa are coping by upgrading the infrastructure. However, this is not the same with Zimbabwe which is experiencing severe water shortages across the country's urban areas. The spectre of water scarcity in the SADC region is likely to seriously undermine food production, environmental conservation and economic development (ibid). Access to safe water supplies and sanitation is limited in many parts of the SADC region, with better coverage in most urban areas, although per-urban areas, informal settlements face sever difficulties in this regard.

There is however, a huge variation in access across the SADC region. For example, the population, which had access to safe drinking water in 1998, was 45% in Angola and 95% for Mauritius and the population with access to sanitation was 16% for Malawi and 100% for Mauritius (UNICEF, 2000). The variation has strongly something to do with priorities rather than the financial at more than 7% per year in some countries, it is argued that most cities in the SADC region have not been able to develop the basic services such as water supply and sanitation, solid waste disposal systems, sewerage treatment, and adequate industrial pollution control to keep pace with the rapid growth of the urban population. This has had dire consequences for water related and water borne disease (Ohlsson, 1995).

Water scarcity is argued to be the cause behind loss or damage to crops, a shortage of domestic water, feminine and diseases (Ohlsson, 1995). Severe water scarcity was noted in Southern Africa during the 1994-5 drought season, which saw a decline in cereal harvest of 35% and a drop in maize harvests of 42% (SADC, 1996). In Zimbabwe for example, the aggregated Gross Domestic Product (GDP) dropped 6% during 1991-2 seasons, while manufacturing sector declined by 9,2% in the city of Bulawayo where water shortages were severe (Ohlsson, 1995).

Water scarcity has negative implications for the socio-economic development in the SADC region. Chenje (1994) asserts that the socio-economic future of people in Southern Africa depends on Agriculture, fisheries, tourism and industrial development to generate employment and growth and he argues this can only be achieved if water of acceptable quality and quantity can be supplied in time, at the right locations, at low cost to support the planned, expected socio-economic development in a country or region.

It is increasingly being realized that substantial learning time is wasted if the rate of school absenteeism due to illness such as diarrhea is very high in developing countries (Rukunga and Mutethia, 2006). A number of schools in Mabvuku, Zimbabwe,

were closed due to water challenges. Without water, schools become a high risk areas for disease outbreaks (CHRA, 2000). Water is increasingly being recognized as fundamental for promoting appropriate hygiene behaviour and children's well-being (Rukunga and Mutethia, 2006). Provision of adequate water coupled with proper hygiene in schools are essential for; enhancing effective learning, attracting enrolment in schools, particularly girls, sustaining a reduced burden of diseases and worm infestation among pupils (ibid).

Water Scarcity in Zimbabwe's Urban Areas

Zimbabwe is generally a water scarce area, which faces periodic drought seasons (Nhapi et al, 2002). The whole of Zimbabwe receives an average population of twelve million people (Hoko, 1999, CSO, 2002). Freshwater is a limited resource and its demand will continue to increase due to population growth, increased irrigation requirements and industrialization. The available renewable freshwater resources per capita is 1340m^3 per capita per year (Hok, ibid). With an annual population growth rate of about 3% (World Bank, 1998), this figure will drop to 840m^3 per capita per year by the year 2025. According to a criterion for renewable fresh water needs per year by Gardener – Oullaw and Engelman (1997) the country will then start experiencing chronic scarcity problems.

Bulawayo, the second largest city in Zimbabwe, with nearly on million inhabitants (Mkandla et al, 2005) is located in the dry part of the country with an average rainfall of 460mm per annum (ibid). Due to the low rainfall levels coupled with high evaporation from the reservoirs and its location on the water shed, the water supply situation in the city of Bulawayo is critical (Mkandla et al, 2005). The droughts in the 1980s and 1990s and the subsequent restrictions and stringent water rationing have maintained the average daily water consumption which was first surpassed in 1979 when the city had a population of about 390 000 (ibid). Population growth coupled with reduced water consumption in the city of Bulawayo (Norplan, 2001). The per capita water consumptions have remained low at 75 litres per capita per day in high-density areas (Mkandla et al, 2005).

The city of Bulawayo has two functional water treatment plants, Criterion and Ncema, which have a combined water treatment capacity of 265 000 cubic metres per day (Mkandla et al, 2005). As such, the water supply situation in the city is not limited by the treatment capacity. From the above discussion, one can conclude that Bulawayo's water scarcity is what Mehta (2001) refers to as the bio-physical water scarcity meaning there are water shortages as a result of little or very little precipitation being received in the catchment. This is contrary to the nature of water scarcity in Harare. The Harare City's average precipitation is 830mm per annum (Jica, 1996; Nyamangara and Mzezewa, 1999), against a population of 1,896 134 people (CSO, 2002). The water supply challenges in Harare relates to Ohlsson's (2000) second order scarcity which is more to do with the ability of society to overcome the water shortages or adaptive capacity to del with water scarcity.

An interesting dimension of water scarcity is illustrated by comparing the case of Mutare in the Eastern Highlands and Bulawayo city in 1995. Chenje et al (1998) point out that a region can experience water scarcity in terms of available water for use whilst receiving adequate precipitation. He cites the case of Mutare in the Eastern Highlands, which he argues can best illustrate the illusion that more rainfall automatically translates into abundant water resources available for human use. He states that the city of Mutare suffered chronic water shortages despite being located in an area which received more

rainfall than Bulawayo. Mutare, he argued faced water shortages in 1995 and beyond though it had only a fifth of Bulawayo's population, which was at 621 742 people during the 1992 census (ibid). One of the main reasons for unaccounted for water in excess of 50% (Lumb and Van der Zaag, 2002). This comparison justifies why water scarcity should be viewed beyond the narrow parameters of assessing the precipitation received against the population.

The Ministry of Health and Child Welfare in Zimbabwe (MOHCW) (ZDHS, 2005-2006) acknowledges the provision of safe drinking water and adequate sanitation are preconditions for improved child welfare. In line with the MDGs, Zimbabwe has targeted to reduce by two thirds, between 2000 and 2015, the under five child mortality rate. The Zimbabwe Millennium Development Goals (2004) progress report points out that infant and child mortality in the 80s had declined but by the 90s saw an increase in both infant and child mortality. Infant mortality increased from 40 to 65 per 1000 live births, while under five mortality increased from 59 to 102 per 1000 live births between 1985 to 1989 and 1989 – 1999. This implies that one in every 15 children will die before their first birthday and that one in ten children will die before attaining the age of five years respectively.

Twelve percent of children under the age of five were ill with some of diarrhea in the two weeks preceding the ZDHS interview, and 2 percent of the children had diarrhea with blood stool (ZDHS, 2006). Interesting to note from the survey is that diarrhea was somewhat less prevalent among children living in households with improved toilet and safe drinking water facilities. The same survey revealed that there were 620 000 reported cases of diarrhea in the two weeks prior to the survey in Harare alone.

The Zimbabwe Demographic and Health Survey (ZDHJS) 2005 – 2006 found out that dehydration caused by severe diarrhea is a major cause of morbidity and mortality among young children. The report contends that a simple and effective response to dehydration is a prompt increase in fluid intake, that is, Oral Rehydration Therapy (ORT). The report adds that in Zimbabwe, the use of sugar-salt-water solution to combat dehydration from diarrhea is the particular method of ORT promoted by the control of Diarrhoeal Diseases Programmes in the Ministry of Health and Child Welfare. Consequently, inconsistent supply of water of adequate quality and quality has calamitous consequences on ORT as an effective response to dehydration caused by diarrhea.

Currently in Harare the sewerage system is predominantly water borne and thus depend on the water supply system for its efficacy. As such, in the absence of water in households, access to safe sanitation in the city is reduced. This as well poses health threats as people opt for open defecation. The ZDHS 2005-2006 posits that proper disposal of children's faeces is important in preventing the spread of diseases. If faeces are left uncontained, diseases may be spread by direct contact or through animal contact. The safe disposal of children's faeces is of particular importance because children's faeces are more likely to be the cause of faecal contamination to the household environment than other causes as they are often mistakenly considered less harmful than adult faeces.It is generally agreed that a person who has access to adequate amounts of safe water is less prone to waterborne diseases, and thus has the capacity to attend school and perform labour (Singh et al, 1999).

When a person has secure access to a safe and nearby water source, can gain the value of the marginal time-savings of water collection (ibid).

Approximately six in ten Zimbabwean children under the age of 18 in the households sampled for the ZDHS were not living with both parents (ZDHS, 2005). More than one-quarter of children were not living with either parent (ibid). Just less than one-quarter of children under the age of 18 were orphaned, that is, one or both parents were deceased. The percentage of children who were not living with both parents increased with age, from just under half of children aged 0-4 years to around 70 percent of children aged 15-17 years. Availability of safe, and consistent domestic water supply will lessen the burden such vulnerable children would face (ibid).

In addition, domestic water scarcity has potential to erode progress made with regards to treatment and care of HIV and AIDS patients as well as other terminally ill people. Despite the nominal increase in budget allocations in The Ministry of Health and Child Welfare (MOHCW), in real terms, per capita allocations declined in the face of increasing demand for health services (IDS, 2003). As a result of the immense burden and challenges facing the delivery system, there has been a deliberate shift to home based care and hospices for terminally ill patients. In view of the above, erratic water supply will consequently increase the burden borne by caregivers and increase the incidence of diseases related to poor sanitation and hygiene. In 1999, it was estimated that about 25% of households in Zimbabwe were without access to safe water supply and 42% lack access to improved sanitation (ZMDG, 2004). Diarrhoeal diseases, largely preventable trough access to safe drinking water, sanitation and food hygiene, are responsible for frequent deaths (ibid).

With the introduction of Economic Structural Adjustment Programmes in Zimbabwe in the 90s many breadwinners were retrenched and forced into micro enterprises to sustain their families (IDS, 2003). The early 90s saw an increase in home industries and some poor families have resorted to backyard agriculture as a livelihood strategy. In view of the above scenario, continuous disruption in the supply of water is likely to impact negatively on the viability of such businesses as well as the livelihood strategies at household level for the majority of the poor in the urban areas. As a result of their weak capital base frequent loss of businesses increases the risk of small businesses folding and consequently loss of income.

Access to safe water clearly plays both a constitutive role, providing freedom from the dilapidating health consequences of unsafe water, and an instrumental role, as an economic and social good, in securing people the opportunity ‘to live the kind of life they value’. People who lack access to consistent safe water and lack financial resources are unable to realize their hopes for life. It is in this sense that destitution results from lack of water and material poverty (Roy and Cow, 2004).

Sanitation problems

According to Barnhart and Barnhart (1988:1844), sanitation refers to the “act, fact or process of improving health conditions”. Sanitation problems can thus be taken to mean those that are associated with improper disposal of garbage and human waste, unsafe water supply and deteriorating health conditions. Another perspective of sanitation obtained from Fuggle and Rabie (1992), is that it refers to the provision of safe, sufficient and accessible water supply and the hygienic disposal of wastes. Sanitation related problems as described above often surface in unplanned, informal communities as well as in high density suburbs where rapid population growth makes it difficult for authorities to provide adequate sanitary

facilities. May (1999) confirms this position when he points out that urban authorities are faced with daunting to provide for proper treatment of wastes for large population, especially when the majority of the people are unable to pay for the services. The conditions purported prevalent in poor or low income communities have and can create several public health problems. For instance, research has shown that discharges of nitrates of concentrations above 50mg per litre have produces combination with haemoglobin molecules that reduce oxygen carrying capacity in young children. In adults the nitrates are converted to carcinogens called nitrosamines that caused cancerous diseases (Wright, 2000).

Seepages and overland flows from household waste and improperly disposed excreta culminate into diseases such as cholera, typhoid, dysentery, hepatitis A, poliomyelitis and gastro-enteritis (ibid). These diseases sometimes occur to epidemic proportions. In addition improper sanitary facilities result in gastro-intestinal infection that reduce nutrients absorption and affect the body's general defense mechanisms. In turn, affected people become susceptible to pneumonia and measles, diseases that have caused wide spread deaths in young children in the developing world (Fuggle and Rabie, 1992). Similarly, water borne diseases like malaria, schistosomiasis, filariasis and yellow fever are not common on tropical communities experiencing water and sanitation problems especially where wells and dams are major water sources. This is so because such water sources provide suitable breeding grounds for vectors such as mosquitoes, fleas, flies and snails (Lewis, 1982) (De Blig and Muller, 1994).

Fuggle and Rabbie (1992) asserted that proximal settlements to household garbage or other waste dumps are characterized by instances of low births weights, reproductive systems disorders, cancerous infections and general growth defects. This has been attributed to the consumption of water and food crops contaminated with hazardous chemical from waste dumps. empirical investigation of particular contemporary phenomena within its real life context using multiple sources of evidence. The qualitative research design is a more descriptive approach. The research design is one of a descriptive interpretation (Neuman, 2000, Miles, 1979). It is attractive because of its massive use of words, which are a specialty of most humans (Gwimbi and Dirwai, 2003).

A survey approach was used in carrying out the case study. This approach enabled the study to begin with only a set of formulated questions. The natural and familiar setting in which the case study was conducted allowed for an unobstructive interaction between respondents and the researcher. Patterns of relative positions of water wells to waste dumps were easily noted from this natural setting, than would be possible in controlled, laboratory type research. The identified patterns lead to important generation on the adequacy and quality of water and sanitation facilities. Kitchin and Tate (2000) confirms that the mode of analysis in qualitative research is mainly inductive, involving the use of unknown facts to produce general principles.

RESEARCH SUBJECTS

Target population and Sampling

In this research, purposive sampling and stratified sampling was used. Purposive sampling is a non-probability sampling procedure in which the researcher uses his/her own judgement to select the sample that represents the target population. Grinel (1993) affirms that in a purposive sampling participants whom the researcher perceives to be good sources of

information are specifically sought and selected for the sample. The fact that this technique gives the researcher the flexibility to decide on participants made it a better option for this study.

Stratified sampling is a sampling method used when one has several homogenous strata making up the population. This means that one divides the sample into smaller samples in proportion to each stratum of the population. Simple random samples of these smaller groups are obtained and these are combined to give a stratified sample (Chimedza, 2003).

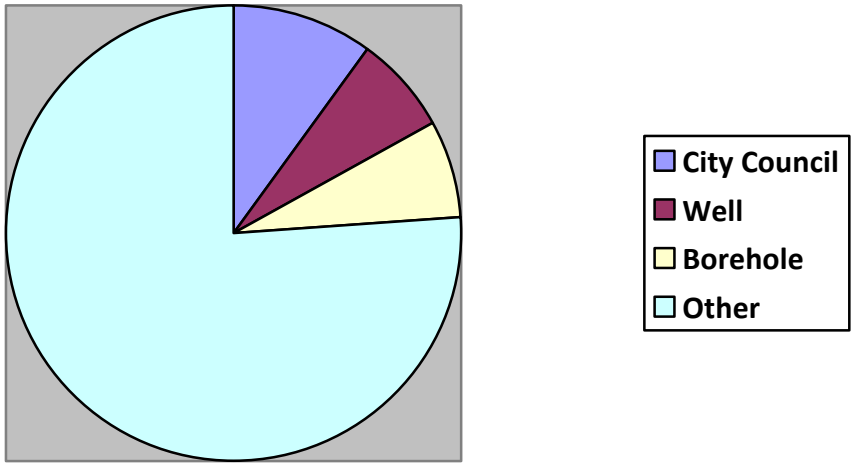
In this case 200 people living or working in Dzivaresekwa 1 high density suburb living between Robert Mugabe Road, Msika Road, Pasipanoya Street and Dzivaresekwa Street were selected irregardless of the level of income, occupation or age. The study area is shown in figure 3.3 below. The area under study consists of Dzivaresekwa Police Station, Dzivaresekwa Polyclinic, Gillingham Primary School, Dzivaresekwa Shopping Centre and Methodist and Roman Catholic Churches. All the people working in these institutions were treated as residence because they spend the whole day in this area and go to their homes just to sleep. Therefore they are also affected and hold the same perceptions with the actual residents, except for people working at the Clinic because they constitute City of Harare department of health, so they consulted in that respect.

The streets and roads in the study area divided the area into subdivisions as strata. The institutions and shopping centre were treated as a single strata. Four strata from the actual residence and the stratum made up of institutions resulted in five strata used in the research project. A sample of 40 subjects from each stratum was selected using purposive sampling.

Clerk, Dr. Tendai Mahachi was interviewed and gave detailed information regarding water and sanitation problems in Dzivaresekwa 1 high density suburb. Also interviewed was the City of Harare Spokesperson, Mr. Leslie Gwindi. Non-verbal responses such as facial expressions, could easily be captured during interviews and hidden meanings were extracted.

NATURE OF PROBLEMS ASSOCIATED WITH WATER AND SANITATION

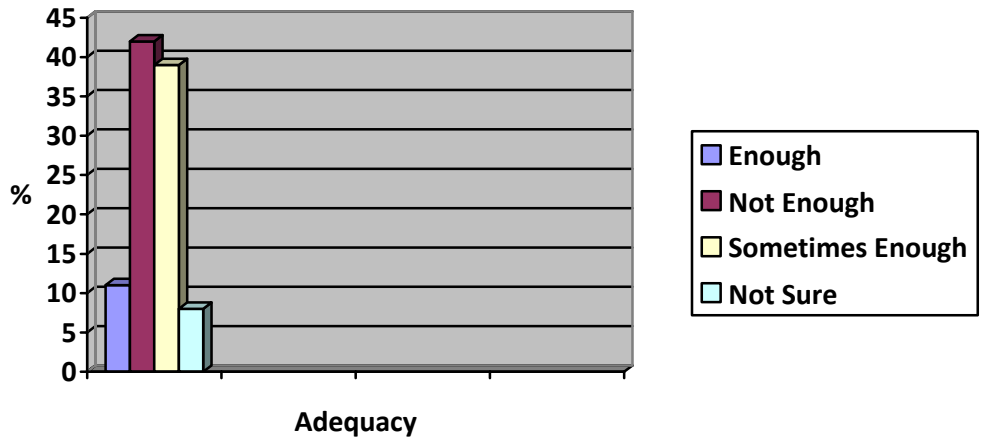
Fig 4.6: Source of Water



Source: Research Findings

From the 200 respondents in Dzivaresekwa 1 high density suburb 10% use water supplied by City Council through its convectional water supply system, 7% use both unprotected and protected wells as a source of water, the other 7% use water from boreholes which are outside the study area. However, the majority use all the sources depending on the day in question. The study shows that, people store water in their homes but when council cut water supply for some days people resort to other sources like both unprotected and protected wells and boreholes.

Adequacy of water supply in Dzivaresekwa 1



Source: Research Findings

Only 11% of the respondents said they are getting enough water, there are those who have deep wells at their homesteads. However, 42% said they are getting less than enough water, 39% claimed the situation varies because at times it is enough and at times not enough while 8% were not sure. The variance in respondents may be a result of the complex situation which created by water cuts.

Quality of Water Supply

Collected data suggests that drinking water in Dzivaresekwa 1 is contaminated. A number of sources for water pollutants have been noted during the study. These are the nature of wells, waste disposal methods used and positioning of wells relative to waste burial sites and open dump sites.

Nature of Wells

Water Wells in use are not adequately protected. Their openings are not elevated enough to avoid entrance of pollutants due to runoff. In addition, most wells are not covered, those covered are done so by corroded and perforated metal sheets which do very little to stop inflows of impurities into the water. A typical example of the wells being used is given in Plate 4.1, showing its opening barely the same level as the ground. The well's inadequate covering is also shown. To add to this, most of the wells in low lying areas used by the respondents are shallow, this is also shown by table 4.1.

Plate 4.1: An unprotected Well

Source Research Findings

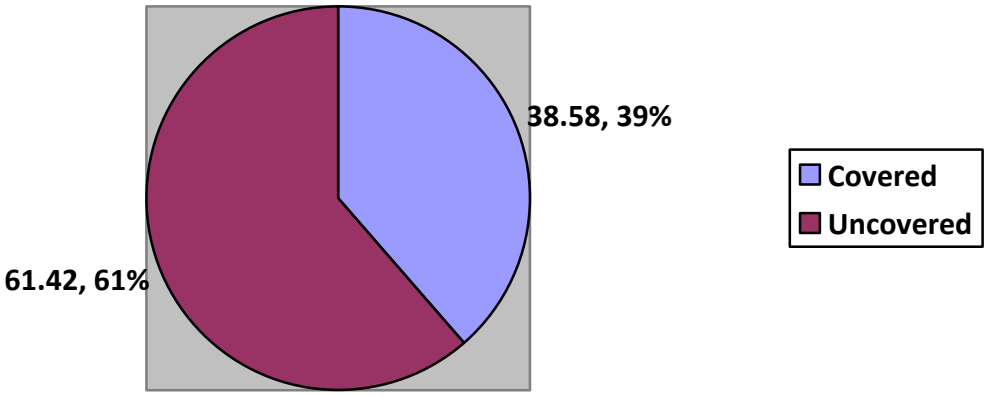
Table 4.1: The Respondents on the approximate depth of the wells.

Depth in Metres	Frequency	Cumulative Frequency	Percentage	Cumulative % Age
1-2	125	125	75,30	75,30
3-4	28	153	16,88	92,18
5-6	13	166	7,82	100
Above 6	0	166	0	100

Source: Research Findings

From the data shown n fig 4.6, 166 respondents use wells as their source of water. These are the ones used in the table 4.1 above 75,3% of these respondents use very shallow wells which range 1-2 metres in depth, 16,88% use wells of depth ranging from 3-4m,7,82, 5-6 metres and none use wells of above 6m. This reflects the danger posed by water from wells.

Fig 4.9: % of Covered Wells

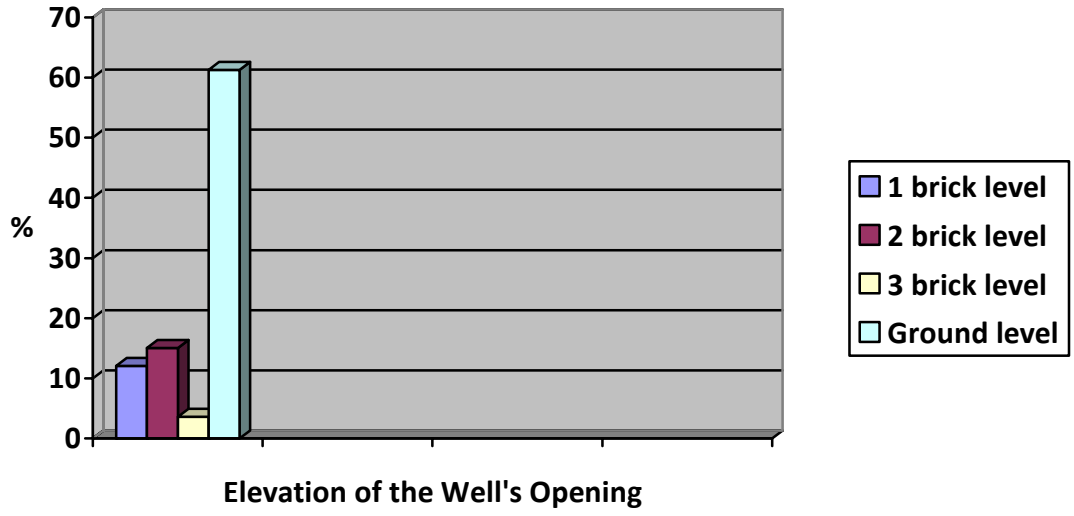


Source: Research Findings

From the pie chart in figure 4.9; 61,42% of 166 respondents said the wells they used were uncovered while 38,58% said their wells are covered. From the observations, most of the wells that are covered are owned by individuals in their homesteads, but to those used by general public, located in low lying areas are mostly uncovered.

From the 166 respondents who use wells as sources of water, 69, 28% said the same as general ground level, 15,06% said 2 brick level, 12,05% said 1 brick level and 3,61% said 3 brick level. From this it is clear that the significant number of wells are not protected from pollutants carried due to runoff. The figure 4.10 illustrate the phenomena described.

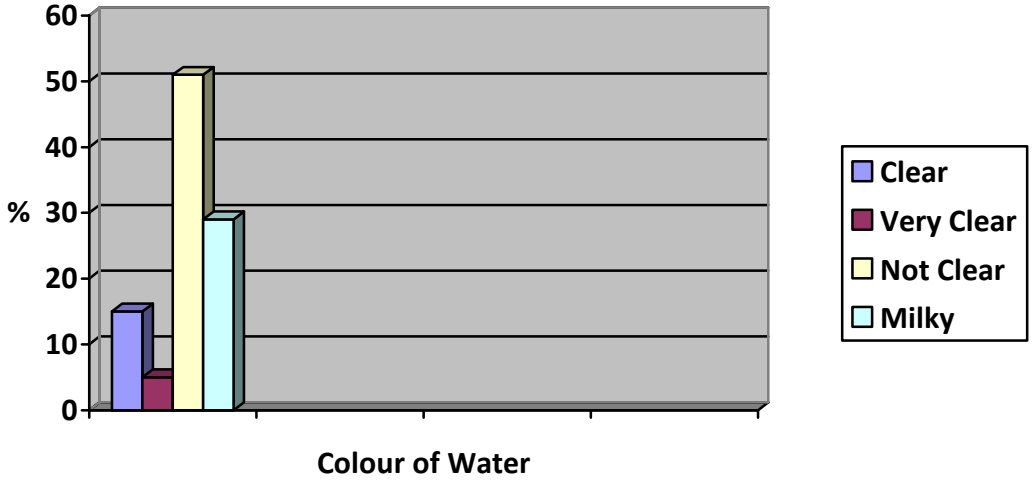
Respondents on the Well's opening above ground level



Source: Research Findings

200 respondents gave different views on the cleanliness of their water. The research viewed this as a result of different water sources and inconsistence in purification of water by Harare City Council. Fig 4.11 illustrates different responses from respondents.

Respondents on the colour of their water



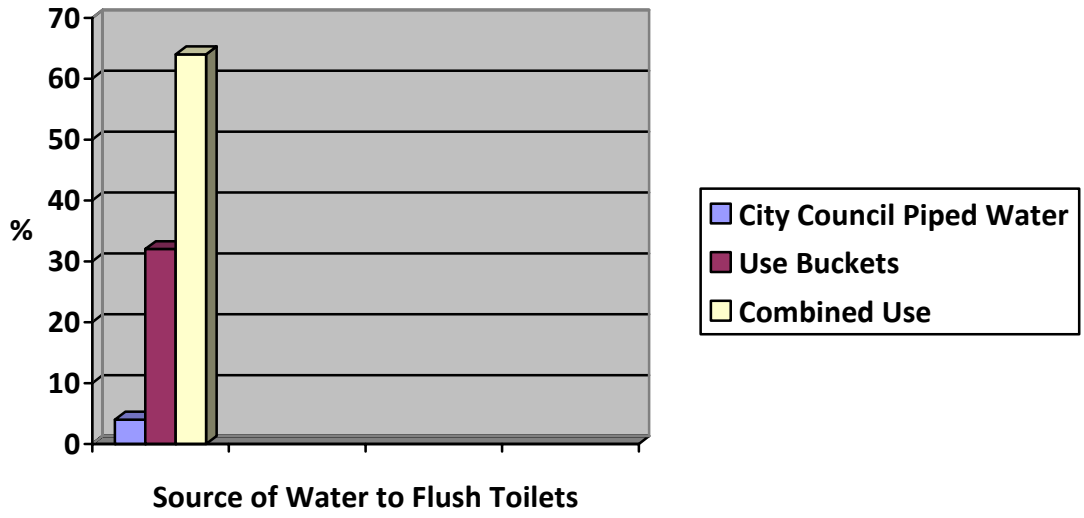
Source: Research Findings

From the diagram 51% said their water is not clear, 29% said it is milky, this translate 80% of respondents claiming that their water is of poor quality against 20% of which 15% claimed it is clear and 5% claimed it is very clear. The above scenario reflects different sources of water used by respondents and lack of standards to the City of Harare of purifying water.

Methods of Human Waste Disposal

Dzivaresekwa 1 high density suburb is well serviced such that the respondents dispose off human waste using flash toilets. However, flush toilets need water because they are part of the City of Harare's convectional water borne sewerage system. Due to frequent water cuts respondents find it difficult to dispose off human wastes. Figure 4.12 shows different responses from the respondents regarding the flashing of toilets in order to dispose off human waste.

Respondents regarding the water used to flush the toilet



Source: Research Findings

From the data presented above, only 4% of the 200 respondents said that they use City Council piped water to flash toilets, 32% said they use buckets. However, the significant number of respondents use both council water and buckets to flush toilets, it is 64% or 128 out of 200 respondents. The main reason, respondents use both methods is the frequent water cuts by the Municipality of Harare.

Household Waste Disposal Methods

Harare City Council is failing to collect household garbage efficiently and effectively. This situation is forcing residents to resort to other methods of waste disposal, this is illustrated in table 4.2

Table 4.2: Responses on Household Waste Disposal Methods used by Respondents

Response	Frequency	Cumulative Frequency	Percentage Frequency	Cumulative % Age Frequency
Burning	14	14	7	7
Burying in the Ground	16	30	8	15
Open Space Dumping	58	88	29	44
City Council Collected	22	110	11	55
All of the above	90	200	45	100

Source: Research Findings

It is interesting to note that all the alternatives used for garbage disposal in the area are a source of water pollutants. Some chemicals do not decompose by burning them, hence can still contaminate water when washed off by overland flow. Buried garbage release chemical leachates and pathogen micro-organisms through percolation, seepage, filtration and leaching. This is supported by studies previously conducted. (Fuggle and Rabbie, 1992). It should be noted that 11% of the respondents claimed their garbage collected by City of Harare only.

Plate 4.2: Open Space Dumping Site in Dzivaresekwa

Source : Research Findings

As shown in table 4.2, 22 respondents pointed out that their household garbage was collected by City Council and a significant number of respondents of 90, claimed they use all the methods to dispose household wastes. Therefore, there were 112 subjects relevant to question 12. This is illustrated by table 4.3

Table 4.3: Responses on the Frequency of the Harare City Council in Collecting Household Wastes

Response/week	**Frequency**	**Cumulative Frequency**	**% Age Frequency**	**% Age Cumulative Frequency**
Nil-Once	92	92	82,14%	82.14%
Twice	20	112	17,86%	100
Three Times	0	112	0	100
More than three times	0	112	0	100

Source: Research Findings

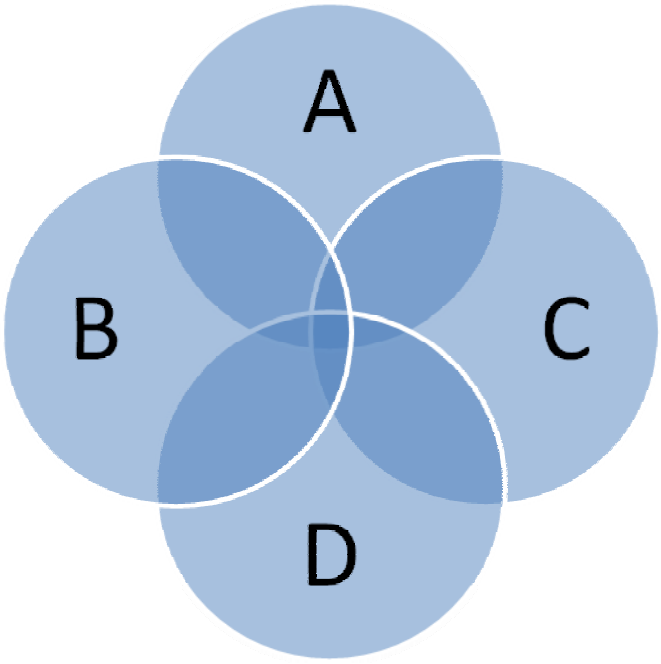
The data in table 4.3 shows that the City Council collected refuse after a time as reflected by respondents of 82,14% who claimed that, it collected nil or once per week. 17,86% pointed out that City Council collect twice a week. However, the researcher observed that at times City Council collect refuse frequently and well, and at times it goes for many days such as the whole month without collecting refuse.

4.3 Positions of Wells in Relation to Open Space Dumpsites

Firstly respondents used wells or all sources of water whilst at the same time use open space dumping or all the methods to get rid of household waste. This is illustrated in the universal set.

Fig 4.13: Respondents on the Approximate Distances of wells from open dumpsites.

Venn Diagram



Source: Research Findings

A	-	Well as Source of Water
B	-	Use all Sources of Water
C	-	Open Space Dumping
D	-	All methods of Household Waste Disposal

Fifty respondents responded to question 14 of Section B of the questionnaire. They indicate the distance between their wells and open dumpsites. Table 4.4 illustrates the responses of the subjects.

Table 4.5: People Responses on Approximate Distance between their Wells from Open Dumpsites

Response	Frequency	Cumulative Frequency	% Age Frequency	Cumulative % Age Frequency
Less than 10m	0	0	0	0
10-100m	22	22	44	44
Above 100m	28	50	56	100

Source: Research Findings

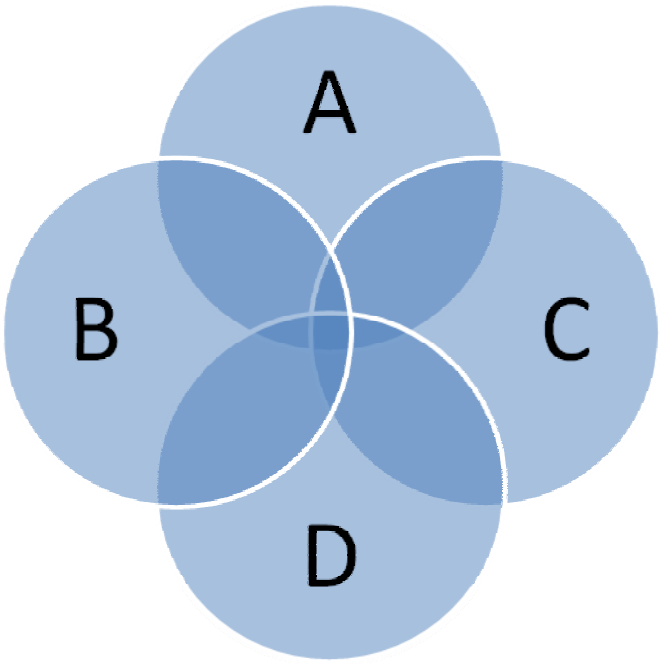
56% of Respondents claimed that there were more than 100m between their wells and open space dump sites, 44% said there is 10 – 100m between the two while no one conceded that there is a gap of less than 10m between wells and open space dumpsites. However, given the nature of wells as described earlier, pollutants from household waste dumps, precariously positioned within the community, find easy access into the water sources. The waste dumpsites harbour chemical and pathogenic pollutants. Such substances are carried to wells in suspension or solution by water runoff, drainage, seepage or leaching. Previous research conducted in cities of Puno and Julica in Peru confirms that poor waste disposal result in accelerated water pollution in surface and underground storages (UNESCO, 2003).

4.4 Position of Wells in relation to Waste Burial Sites

Sixty seven respondents used wells or all sources of water whilst at the same time bury the wastes in the ground or use all the methods to get rid of household wastes. This is illustrated in the Universal Set.

Fig 4.14

Venn Diagram



Source: Research Findings

A	-	Well as Source of Water
B	-	All Sources of Water
C	-	Bury in the ground as a method of Garbage Disposal
D	-	use all methods of Waste Disposal

Sixty-seven (67) respondents indicated the distance between their wells and the garbage burial site. The researcher observed that most of these people are those with wells at their homesteads. Table 4.5 illustrates the responses of the sixty-seven respondents.

Table 4.6: people's responses on approximate distances of wells from household wastes burial sites.

Response	Frequency	Cumulative Frequency	% Age Frequency	Cumulative % Age Frequency
0-2m	10	10	14,93%	14,93%
3-4m	42	53	62,69	77,62
5-6m	11	63	16,42	94,04
Above 6m	4	67	5,96	100

Source: Research Findings

The wells at respondents' homesteads are close to the household wastes burial sites. 14,93% said the distance is 0-2m, 62,69% claimed 3-4m, 16,72% said it was 5-6m and a paltry of 5,96% said the gap is above 6m. The small gap between wells and waste burial sites may be attributed to the stand sizes, most of the residential stands in Dzivaresekwa 1 are 140-300m^2. Theory given by construction experts stipulates that wells and boreholes must be located not less than 30 metres from waste burial sites (Choga, Mukova and Mushowo, 1999). It seems logical, therefore to conclude that private household burial sites are contributing to water pollution, since they are far less than the recommended distance from wells.

Extent of Sanitation Problems in Dzivaresekwa 1

As shown in figure 4.12, 128 respondents use both buckets and Council's water to flush their toilets, 64 use buckets only, except for 8 respondents who use Harare City Council's piped water. These findings have profound implications to environmental health.

Firstly, faces stay longer in toilets encourage survival of pathogenic micro-organisms that cause many diseases. Secondly, flies from toilets act as vectors for harmful bacteria to food stuffs in homes, resulting in possible occurrence of diarrhoeal diseases such as cholera and dysentery. Table 4.5 shows responses from respondents regarding diseases that either the respondent or any of her/his family members has suffered from, during their stay in Dzivaresekwa 1.

Table 4.7: Health Problems among residents

Health Problem	Frequency	Cumulative Frequency	% Age Frequency	Cumulative % Age Frequency
Stomach Diseases	91	91	45.5	45,5
Skin Diseases	59	150	29,5	75
Malaria	50	200	25	100
Bilharzia	0	200	0	100
Other	0	200	0	100

Source: Research Findings

From the data above, stomach diseases are wide spread, with 45,5% of respondents confirm this, followed by skin diseases and then malaria with 29,5% and 25% respectively. Stomach diseases are mainly caused by consuming contaminated food or drinking contaminated water. Skin diseases are caused by various factors; unhygienic environment promote the breeding of skin diseases causing pathogens such as bacteria. Malaria is mainly by stagnant sewerage pools around Dzivaresekwa 1 high density suburb. Plate 4.3 shows on of the pool of sewerage.

Plate 4.3: Stagnant Sewerage Pool as a result of burst pipe.

Source: Research Findings

In 2009/10 Zimbabweans and other residents of Harare witnessed a collapse of service provision, by the City of Harare. Some people pointed to the City Fathers for incompetence. There was replacement of elected Councils by commissions. Firstly, it was Chanakira Commission replaced the ZANU-PF dominated Council, led by the former Mayor, the late Solomon Tavengwa. In 2003 another commission led by Sekesai Makwavarara replaced the MDC dominated Council led by the former Mayor Elias Mudzuri. However, this did not help the City of Harare as the situation deteriorated during the same period. From the informal interviews carried out by the researcher, 90 % of the respondents pointed at the Central Government for failure of Harare City Council. Supporting their argument, "the researcher does not know if it was a coincidence", most people pointed to all the local authorities' failure at the same period. It is true that almost local authorities collapsed during the period, with small towns failing even to pay its workers for many months.

Strengthening their argument, the respondents point to all sectors of the economy, from government department, parastatals, agencies to private sector, even the Zimbabwe Stock Exchange collapsed completely in 2008. The arguments of the respondents were so strong that it was worth an investigation. The researcher noted that the issue of who caused the woes is an emotional one. The collapse of all the sectors reflected the central nature of the problem, it is likely that the problem is of governance.

Table 4.8: Respondents regard of who is responsible for the problems of water and sanitation problems.

Response	Frequency	Cumulative Frequency	% Age Frequency	Cumulative % Age Frequency
Residents	10	10	5	5
City Council	66	76	33	38
Central Government	92	168	46	84
Not Sure	28	196	14	98
Others	4	4	2	100

Source: Research Findings

From table 4.5, 46% of the respondents blamed Central Government for their woes, 33% blamed Harare City Council for incompetence, 5% blamed the residents, and 2% blame other factors such as sanctions, lack of democracy, poor international relations and violations of our laws.

From the informal interviews and observations, besides just blaming the City of Harare, respondents said the City of Harare should priorities service delivery than to concentrate on perks of its top management. They also said the local authority should stop to recruit its workers on political grounds, but recruit the right people for the right job. The residents said they are prepared to help the Harare City Council to address the situation by guard against vandalism and misuse of treated water.

Turning to the Central Government, the residents, the residents advocated for the devolution of power to the City of Harare. They pointed out that the city is too big for it to wait for the approval of the Ministry of Local Government and Urban Development. They said if the local authority become an autonomous body it eliminates bureaucracy and red tape in its operations and also reduce political interference by ruling party through the Minister of Local Government and Urban Development. During the period in which the researcher collected data, the attitude of the residents and some wards used showed that the devolution of power be included in the Constitution. At the time of writing this research, there was consultation by the Parliamentary Committee on Constitution on constitution through its outreach programmes on the writing of a new constitution.

Contribution from the City of Harare Officials

It was the researcher's wish to interview City of Harare Town Clerk, however, due to the latter's tight schedule, it did not materialize. Fortunately, all was not lost because the researcher managed to interview City of Harare Spokesman and got valuable information, others interviewed are Director of Water and Sanitation, Director of Waste Management and the

District Officer of Dzivaresekwa high density suburbs. City of Harare's Spokesman said the main reasons for failure to provide proper sanitation and water supply is partly because of frequent power cuts at its water treatment plants, particularly Morton Jeffrey and also leakage of purified water due to old pipes and vandalized infrastructure. He admitted that complaints from Dzivaresekwa were made on the problems of water and sanitation. He said residents complained about heaps of garbage and that the council cleared most of the heaps but because of lack of frequent follow-ups the piles of garbage emerged again. He went on to say that health problems of diarrhoeal diseases are still being reported more than a year after the major cholera outbreak of late 2008. In addition, the Spokesman assured the researcher that council ha enough drugs to deal with any outbreak of diseases. However, he pointed out that it is not the council's policy to control rather than to prevent, but t is just a circumstance at the moment.

Asked about the number of employees the city of Harare is supposed to employ, the Spokesman said the City of Harare is supposed to employ 11000 workers at the moment against 7000 it actually employed at the time of carrying out this research. Turning to refuse trucks, the City Spokesman admitted that he was not sure about the exact number of refuse trucks but pointed out that they were very few refuse trucks and this forced the council to hire private contractors at times. He further said the human resource and equipment scenario is a constraint to the operations of the council. However, on a positive note, the Spokesman assured the researcher that the City of Harare was granted permission by the Central Government to borrow US$10 million to purchase trucks for refuse collection.

Asked how the council prioritise its work, he said that, in the eyes of the people, waste management and water and sanitation appear to operate in isolation. He said all nine departments work complementary, so an attempt to isolate another department will disturb the complex matrix and plunge the whole council in turmoil. He gave an interesting example, the department of water and sanitation cannot work if it is prioritized in the expense of the Engineering department.

On the expectation of City of Harare from Central Government, the City Spokesperson said devolution of power by the Central Government will go a long way in removing red tap on bureaucracy. This will also remove interference in the day-to-day activities of the council by the Central Government. To the residents, he appealed for them to play their part by not vandalizing the City Council infrastructure and also minimize wastage of treated water. The City's Spokesman concluded by commenting on the adequacy of raw water from the surrounding dams which supply the City of Harare and Satellite towns like Chitungwiza, Ruwa, Epworth and Norton. He pointed it clear that, the water shortage in Harare has nothing to do with amount of raw water in its dams but lack of capacity to purify and distribute the water on the part of the council and also the phenomenon of power outages.

The Director of Water and Sanitation said if given all the resources he can perform all the required work. He said his departments need engineers and a lot of finance so t s not an easy one. However, he said given that City Council channelled a lot of money in 2009 to the department, it managed to upgrade some of its infrastructure and it is looking forward to do so in 2010 after the rain season. The Waste Management Director also said lack of human and material resources to collect refuse is his major problem. However, at the time of writing, he was optimistic that they will be a delivery of refuse trucks, as soon

as the council paid for them. Dzivaresekwa District Officer said given all the necessary equipment and human resource, the problems can be minimized. He said the council will do its best by prioritizing Dzivaresekwa in regard to water supply. He also said the problems of diarrhoeal diseases are not yet over.

CONCLUSIONS

People in Dzivaresekwa 1 appear to have inadequate water supplies for domestic needs because of frequent water cuts by City Council. Findings suggest that City of Harare is failing to collect refuse regularly due to lack of finance to purchase refuse trucks. It appears that the identified water and sanitation problems impact negatively on the local people's health and well being by spreading diseases. The majority of residents blame activities and interference of Central Government for their problems, while a significant number blame the City Council as well because of its incompetence. People want devolution of power to the City of Harare to remove bureaucracy and red tapes. The residents are optimistic that their situation will improve in few years because they believe their problems are directly related to political situation in Zimbabwe. Frequent power cuts worsened the problems because of halting of water treatment plants which are responsible for purifying water

RECOMMENDATIONS

The City of Harare should partner with private investors so as to raise financial resources for water and sanitation operations. The City of Harare should retain and attract new engineers by offering better salaries and provide incentives to them like houses and stands and bond them for it to succeed in the long run and avoid employment on corruption grounds. Devolution of power by Central Government is recommended as soon as possible and minimization of interference in the activities of the local authority by the Minister of Local Government and Urban Development for his personal and political gains. Public awareness campaigns and education programmes be conducted to equip residents with the knowledge of water pollution and how it can be minimized. Focus should also be on proper sanitation and hygiene behaviour at grassroot level. There should be community involvement in water management process by way offsetting up committees or user associations. This helps residents to have a sense of responsibility and thus curb the occurrences of vandalism of water and sanitation related equipment. The Central Government should bail out the national power utility, the Zimbabwe Electricity Supply Authority to avoid power cuts at water treatment plants of the government may return the central power station in Harare to the City of Harare for it to generate its own electricity so as to guard against power cuts at treatment plants. The Urban Councils' Act should be amended, setting the minimum qualifications for a person to contest as a councillor and make it mandatory for political parties to observe these conditions. For a person to contest as a councillor, he/she must have at least a diploma or have a history of success in running any organization or a business

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