WATER, SANITATION AND HUMAN DEVELOPMENT IN URBAN FRINGE SETTLEMENTS IN NIGERIA

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Abstract
The importance of water and sanitation facilities has been reflected in the measurement of human development and in their inclusion in Millennium Development Goals (MDGs). Water and sanitation facilities attain a unique situation at the urban fringe. This study is focused on the investigation of the supply of water and sanitation facilities in the fringe settlements along a development corridor of Minna, Nigeria. This corridor is attracting development from both federal and state institutions including large scale housing development. The settlements are outside the limits of water mains for the city of Minna and have received little attention in the provision of water and sanitation facilities. The present state of water and sanitation in these settlements connote low human development and stand at risk to the health of the people. The danger of serious impact on health with current urbanization of these settlements calls for re-evaluation of a laissez-faire approach that leaves the residents to informal adjustment. Against these backgrounds, the objectives of this paper are to investigate access to water and sanitation facilities in the urban fringe settlements, to determine the adequacy of these facilities; to investigate coping mechanisms by the people, to understand the burden of water search and how these are likely to affect health and human development and to discuss how integrated community-based efforts could improve water and sanitation facilities in the settlements.
Keywords: water, sanitation, deprivation, poverty, human development.

1. INTRODUCTION

The urban fringe constitutes an important interface in settlement continuum and for a developing country such as Nigeria, it provides a buffer for people, urban physiology and economy and in particular livelihood and services. The fringe is seen as the frontier in space where the returns to land from traditional and customary urban land uses are roughly equal to the returns from traditional and customary rural land uses (Hite, 1998). It is space located outside the limit of the city (Avram, 2009 and Saxema, 2008). Such area reflects the pressure of the city on the surrounding neighbouring space (Avram, 2009). The fringe is also characterised by random, separate and fragmented growth (Alabi, 2009). Largely, fringe settlements 'develop outside of government control and do not follow strictly formal and traditional urban planning and development processes', (Hogrewe, Joyce and Perez, 1993). In economic term, the fringe is seen as a space where livelihoods depend on natural resources (Adesina, 2007). Hence, 'land is characteristics to agricultural activities and the inhabitants' way of life is

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specifically rural' (Avram, 2007). As a result, people who reside in the fringes live in the economic realm of the city but are not attracted to urban economy (Taleshi, 2009).

The visible marginalisation in economy and land uses found expression in service and governance. While the atmosphere of the city reigns in the fringes, the full benefits of the city are lacking. As a result, 'unauthorised construction, illegal sub-division, urban sprawl, environmental degradation are all parts of urban fringe' (Uttarwar and Sokhi, 1989). The different perception of the fringes has given rise to its many names such as peri-urban, suburb, city edge, metropolitan shadow, among others (Adesina, 2007). Of all problems faced by the city, perhaps the most visible and frustrating to the residents is service deficiency manifested in low level of power supply, water supply, poor sanitation, poor and inadequate road network, poor security facilities and even economic facilities.

In recent time, the observed developments of Minna beyond its traditional limit is bringing many hitherto rural land under the influence of the city. This expansion became quite visible in the last five to seven years during which relative increase in salaries, increase government resources that encouraged construction activities beyond the city and institutional expansion have all encouraged growth of the city. Of particular note in this expansion is Minna-Bida road. For long, development along this corridor has been negligible. However, with the movement of the Federal University of Technology (FUT) to its permanent site along this corridor and similar development of the permanent site of the National Examinations Council, the face of this corridor has changed. Within the last three years, two major housing estates have developed along the corridor, a 500 unit housing estate owned by Niger State government and a 30 unit housing estate owned by the Federal Government. In addition are other institutional and private developments. All these are changing the status of the hitherto sleepy rural settlements to active and urban-looking settlements. Some staff and students of the FUT now have to live in the villages immediately surrounding the university.

However, the changes associated with the emerging urbanization of these settlements do not include service improvement. Indeed, no formal supply of electricity in most of the villages and all are outside the limit of the municipal water mains and city drainage network. Daily, people commute between the FUT campus and the city and witness the deprivation in facilities and services in these settlements. The deprivation in services in these settlements affects the realization of possible multiplier effects of both the FUT and the NECO on the economy and livelihoods of the villagers. In this study, attention is focused on water and sanitation in the fringe settlements. The objectives of the paper are to investigate access to water and sanitation facilities in the urban fringe settlements, to determine the adequacy of these facilities; to investigate coping mechanisms by the people and policy responses by the

governments, to understand the burden of water search and how these are likely to affect health and human development.

2. HUMAN DEVELOPMENT DIMENSION OF WATER AND SANITATION

The persistency of poverty in many parts of the world brought a new focus to poverty analysis and policies. The new approach sees human welfare from the point of view of human development, an approach that reflects the multidimensional nature of poverty and that also emphasizes the real benefits of progress as they touch the people, in practical terms. That poverty is multidimensional means that both the analysts and policy makers have to look beyond income in defining and addressing poverty. From this perspective, the UNDP (2006) sees poverty as 'a state of long term deprivation of those essential materials and non-material attributes of well-being which are considered necessary for decent living'. From this point of view, development is supposed to offer options for people, options for livelihood development, options for access to a variety of services and goods, options for easy mobility and options for good quality environment. Where these options are constricted, human development becomes hampered. Water and sanitation are important components of human development. The UNDP (2006) maintains that water is not only the stuff of life but also that water and sanitation are among the most powerful drives for human development. Therefore, it is not a surprise that the components of human development index (HDI) are reflective of the role of water and sanitation in human welfare. One of the three measures of HDI, longevity is partly dependent on access to improved water supply and improved sanitation.

In a more direct form, the Human Poverty Index 1 (HPI 1), a variant of HDI measures welfare by incorporating access to water . the HPI 1 measures economic deprivation by the percentage of people lacking access to health services ands safe water and percentage of children under five who are malnourished (Johan, 2002) as one of its three key indices. To drive home the human development input of water and sanitation in measuring welfare, the Millennium Development Goals (MDGs) include water and sanitation in its seventh goal and target 10. The MDGs are the expression of the strong commitment to universal development and eradication of poverty by the International Community (Bourguignon et al, 2008). The Goal 7 of the MDGs wants to ensure environmental sustainability while the target 10 seeks to half by 2015 proportion of people without access to sustainable water and sanitation. The goal and target drive home the human development outlook of water and sanitation. This drive throws its own challenge because 'achieving that target is critical to the attainment of other goals. Clean water and sanitation would save the lives of countless children, support progress in education

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and liberate people from the illness that keep them in poverty' (UNDP, 2006). The link between water and sanitation and other goals can be seen as presented in Table 1.

TABLE 1 - HOW WATER RELATES TO OTHER GOALS OF THE MDGS

Goal	What access to water can do
Poverty and hunger	Reduction in expenses on water will preserve income for other uses; enhance food processing and water-based livelihood production activities of the poor
Universal primary education	Reduced time spent in search of water will release children for school and give time to mothers to prepare children for school. It will also eliminate school days lost to water search and prevent possible withdrawal from school for water search
Gender equity	Less burden for women and more time to spend on productive activities. Women economic activities based on water will also be enhanced.
Child mortality	Improved drinking water will reduce incidence of water-borne diseases that kill children and improve sanitation that also endanger life.
Maternal mortality	Reduced water search burden by pregnant women will improve their health and reduce pregnant-related health risk
Partnership	All stakeholders would act to promote and sustain water for all.

As Table 1 shows improved access to water will improve household income, releases children for school, enhance gender equity by reducing the burden of water search for women, create opportunities for livelihood activities, reduce disease incidence among children and mothers and engender partnership among all stakeholders. Shaban (2008) captures this relationship when he remarks that ' a large share of population from poorer section of the society (both in rural and urban areas) loses their precious time collecting water for their daily needs. This deprives them from daily wages crucial for their economic sustenance. Further, recurring health expenditures due to consumption of unclean water and lower wages due to lower skills keep them in vicious cycle of poverty'.

The implication of water for human development is that access must be guaranteed; making access to water as a right. Right-based approach (RBA) 'entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for essential personal and domestic uses (Swiss Agency for Development and Cooperation, SADC, 2008). This right also means that every person should have access to information on water and sanitation issues and to hygiene education. Therefore, the key elements of RBA to water are safe and acceptable water, accessible services, sufficient quantity. Absence of these key elements signifies deprivation in water access. It also means loss of water security. According to UNDP (2006) 'water security is about ensuring that every person has reliable access to enough safe water at an affordable price to lead a healthy, dignified and productive life, while maintaining the ecological system that provides water and also depend on water'.

According to the UN (2008) water deprivation is measured by physical water scarcity which occurs when 75 percent of river flows are withdrawn and economic water scarcity where human, institutional and financial capital limit access to water, even though water is naturally available. Water deprivation brings about water poverty, water stress or water insecurity. Water poverty according to Cook and Gichuki (2006) means lack of well-being attributable to water. It is reported that WHO and UNICEF set a minimum requirement of 20 litres a day from a source of within 1 km from the household . The 20 litres are sufficient for drinking and basic hygiene. 'Below this level, people are constrained in their ability to maintain their physical well-being and dignity that comes with being clean' (UNDP, 2006). The relevance of water to human development also means that drinking water presents itself in a ladder system. The higher up the ladder, the better the access to water for higher human development. At the bottom of the ladder is unimproved drinking water sources that include unprotected dug well, unprotected spring, cart with small tank/drum, tanker truck and surface water/river, dam, lake, pond, stream, canal, irrigation channels) bottled water (UNICEF/ WHO, 2008). This is followed by other improved drinking water sources that include public taps or stand pipes, tube wells or boreholes, protected dug wells, protected springs and rainwater collection. At the top of the ladder is piped water on premises that include piped water connection located inside users' dwelling units, plots or yard.

Water is closely related to sanitation and together they both influence human heath and development. According to WHO (2008) sanitation in its original form, mean "the promotion of hygiene and prevention of disease by maintenance of sanitary conditions". In the nineteenth century the term "sanitary" was understood to mean "of or relating to health, or relating to or used in the disposal especially, of domestic waterborne waste" (Merriam-Webster's Collegiate Dictionary, eleventh edition) while in recent time sanitation means "the collection, transport, treatment, and disposal or reuse of human excreta or domestic waste water, whether through collective systems or by installations serving a single household or undertaking". According to Wikipedia (accessed 30/01/2010) 'sanitation means hygienic means of promoting health through prevention of human contact with the hazards of waste'. Aspects of sanitation according to Wikipedia include basic sanitation, food sanitation, on-site sanitation, environmental sanitation, and ecological sanitation.

Like water, sanitation has influence on human development. The important role that water has in meeting the MDGs led to the declaration of Water for Life Decade (WLD), 2005-2015 by the UN. The challenge for the WLD are three. First, to maintain the gains made in water access. Second, to push ahead quickly to provide drinking water and sanitation services to millions of people living in rural areas and thirdly, to accelerate the successful efforts in urban areas to keep pace with the rising urban population, particularly by focusing on low income and disadvantaged groups (WHO and UNICEF,

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2006). Similarly, to drive home the challenge of sanitation, 2008 was declared the International Year of Sanitation by The General Assembly of the United Nations through its Resolution A/C.2/61/L.16/Rev.1 dated 4 December 2006. The key elements of the IYS are that sanitation is vital for human health, sanitation generates economic benefits , sanitation contributes to dignity and social development, sanitation helps the environment and that Improving sanitation is achievable. Sanitation practices are in form of ladder like water so that the lowest part of the ladder corresponds to low level of sanitation and the highest part, high sanitation level. At the lower part is open defecation where open fields, forests, bushes, bodies of water or other open spaces are used as toilets (UNICEF and WHO, 2008). It is followed by unimproved sanitation practice where people depend on pit latrine without slabs and bucket latrine. Shared sanitation occurs where two or more households share sanitation facilities. The top of the ladder is occupied by improved facilities that ensure hygienic separation of human excreta from human contact. They include piped sewer system, septic tank, improved ventilated pit latrine, pit with slab and composting toilet.

3. METHODOLOGY

The study depends largely on primary data. Data were collected through a structured survey system; consisting of two layers. The first layer is household-based questionnaire survey while the second layer is focused group questionnaire survey. In the household-based survey, questionnaire was applied to households in each of the five fringe settlements. The questionnaire consists of questions in relation to sources of water supply, location of sources of supply, adequacy of supply, adaptation to water inadequacy, water quality and treatment as well as the burden of water search. It also consists of questions on type location and condition of toilet facility, waste water disposal, solid waste type and disposal and knowledge of sanitation campaign. The focused group survey paid attention to women and asks questions in relation their experiences on getting water for their households and the specific problems they face. The questionnaire was applied to four groups of women in two of the five selected fringe settlements. Physical observation was also undertaken to identify water sources and to also examine physical appearance of water and the struggle for water at the sources. Five settlements were selected for the study. These settlements with their population are Dama (550), Jatapi (600), Gidan Kwano (700), Epigi (450) and Lunko (500). While Lunko is located three kilometres off Minna-Bida road, all other settlements are along the road. However, all the five settlements have a feel of the city of Minna to qualify them as fringe settlements. The corridor is a 10 kilometre stretch from Minna along Bida road to the main campus of FUT, Minna. Minna is the capital of Niger State, Nigeria while Bida is the second largest city in Niger State. For the household-based questionnaire survey, 80 households

were selected; 20 from each village. However, 75 questionnaires were properly attended to. So, the analysis of data is based on the 75 copies properly filled. Households were selected from compounds randomly selected within each village. A compound consists of many households who pay allegiance to one head. Data analysis is by description of the frequency run of the responses to the questionnaires, using percentages and drawing inferences.

4. DATA ANALYSIS AND FINDINGS

In this section, attempts are made to present data and analyse them. Analysis is focused on water resources, the burden of water search, adaptation to water inadequacy and sanitation characteristics.

Water Resources

A critical factor in water resource base of the study area is its geographical location. Being located in the Savannah belt of Nigeria where rainfall in low and is concentrated to between four to five months in a year, surface water resources are limited and this also imposes some limitation to ground water level and ground water recharge. This limitation is clearly expressed in the water sources available to the five villages covered by the study. Table 2 shows the sources of water among the five villages covered by the study.

TABLE 2 - WATER RESOURCES OF THE FRINGE SETTLEMENTS

Village	Water sources		
	Well	Stream	Borehole (hand pump)
Dama	2	-	-
Jatapi	1	1	1 (private)
Gidan Kwano	1	1	2
Epigi	1	1	-
Lunko	1	2	1 (private)

Source: Author's field survey, 2010

The Table shows that well, borehole and stream are major sources of water available to the people. The boreholes are protected and are fixed with hand pump. In Dama, there are two covered wells; one for each sector of the village. In Jatapi, there is one well to serve the villagers. There is one private borehole located in a new rental house occupied by staff and students of FUT, Minna and so, access is restricted to the occupants only. There is a seasonal stream away from the village and used by the villagers during the rainy season. The situation is a little better in Gidan Kwano where there are two public boreholes and one well. The boreholes are used by all the members of the community. However, the well belongs to the Fulani community of the village and its use is restricted to the Fulanis only. At Epigi, there is only one well which belongs to the community mosque but which may be made available

for use by the members of the community. However, given the closeness of Epigi to Gidan Kwano, members of Epigi community also rely on one of the boreholes in Gidan Kwano for their use. So, it is safe to say that the two boreholes in Gidan Kwano are shared by the two communities. Lunko perhaps present a unique situation. There are one well, two streams and one borehole. The well is used by a section of the community while the two streams are used by all the sectors of the community. The borehole is a private one owned by a member of the community. Its use is highly restricted. The owners claim that even their own women go to steam to fetch water. While the owners claim that they do not collect money for its use, the members of the community said that they pay. However, paying for water located within the community looks strange to the majority of the people. So, they do not patronize the borehole and do not consider it to be a source of water for them. The stream water is visibly coloured and yet, it is the major source of water for all purposes for the people of the village. The streams are the major source of water for drinking and domestic use by the people. It is shocking to see people drinking water from these streams.

Water Burden

The characteristics of water supply system can be observed by examining water quantity, quality, water search, water treatment, reliability/variability and source maintenance. In term of quantity, it is possible to estimate the quantity of water from the boreholes. In doing this attention is shifted to public boreholes, since these are the ones to which the villagers have free access. Offat and Kamuzungu (2009) estimated average yield of protected well as 1400 litres during wet season and 600 litres during the dry season. Based on this and keeping all other things constant, water quantity per village can be estimated as shown in Table 3. Using an average of 1000 litres daily yield per ground water source; it is found that daily water yield varies from 1000 litres in Jatapi, Epigi and Lunko to 3000 litres in Gidan Kwano. In Dama, the total daily yield is 2000 litres. These estimates do not take surface water into account. Among the five villages, surface water is most important in Lunko. The two streams in the village are seasonal and most of the villagers depend on them for drinking and domestic uses. The impact of low water yield on individuals is seen in the water per head, as shown in Table 3. In all the settlements, water yield is less than 10 litres per head. It is four litres per head in Dama, and five litres per head in Gidan Kwano. In term of quality, only the boreholes can be said to be of high quality and relatively reliable for direct drinking. However, at the peak of rains when water level rises considerably, the borehole water becomes polluted and appears coloured. Same holds for other sources, the wells and the streams. The worst however, is the streams. Observation of the stream in Lunko shows deeply coloured water used for drinking by the community. Reliability of all the sources of water becomes

threatened during the dry season. The low water yield from the ground water sources means that the people have to depend on the surface water to augment the ground water.

TABLE 3 - WATER YIELD AND ADEQUACY

Village	Population (2009)	Number of borehole/well	Estimated yield in litres	Water per head (liters)
Dama	550	2	2000	4
Jatapi	600	1	1000	2
Gidan Kwano	700	3	3000	4
Epigi	450	1	1000	3
Lunko	500	1	1000	2

Source: Author's field survey and estimates

During the dry season, water level drops and the yield from these sources also drop. Members of the community spend considerable longer hours at the wells and streams to get water. Long queues are experienced at the water sources The long queues alters the waiting period and the time spent per trip to fetch water. During the rainy season, average trip stands at 15 minutes to 30 minutes (Box 1). However, during the dry season, a trip lasts for between one to two hours. To the women, it is a harrowing experience. The search for water has a gender dimension. Women are largely responsible for the search for water. It is a traditional responsibility of the women to fetch water. They are assisted by both male and female children. But as the male children grow, they shed the responsibility for the women only. Pointing to a boy, a woman noted 'it is the men who suffer us. This, (the boy) will not fetch water'. The experiences of the women in searching for and fetching water are the same in all the villages. Average trip per person is three per day and water is fetched largely in the morning by 55 percent of the people and in both morning and evening by 29 percent (Box 1). So, fetching water is a morning duty for most women and even children. The water issue therefore, presents a unique burden for women. They could be seen gathered around wells and boreholes in the morning and this gathering may last till noon during the dry season.

Adaptation

The problem of water in the five communities is clear to the people; both men and women. First, the community wells and boreholes are managed by the people. In Gidan Kwano, the borehole is under the management of men who organize and ensure repairs of the boreholes. However, financial contribution for the repair is borne by all, both men and women. Such contributions are also the same. For example, in a recent repair effort witnessed by the author, each matured person contributed 100 Nigerian Naira. A woman reports thus ' in my house, there are three women (her self and two daughter in-laws). So, we paid three hundred Naira; and plus my children (two male children) making five hundred Naira.

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Justifying the contribution, the woman also notes that ' we cannot ask the government to come and repair the borehole for us. We use the borehole and to start to write letters for repair, how long will that take to repair the borehole and make water available to us?'. This clearly expresses the feelings of the people. During the rainy season, the people also attempt to harvest rain water. The harvesting takes place by all respondents by the use of bowl and drums. There is no serious storage facility beyond bowl and drum for water harvesting. In all, 91 percent of the households harvest rain water. Where water quality becomes unbearable, a few of the households also buy sachet water which in Nigeria is popularly called pure water. At a rate of five Naira per sachet, it is affordable to most households. But when, households have to depend on it as a daily requirement, the burden becomes huge and telling on their financial resources. Water treatment is undertaken by 42 percent of the respondents (Box 1). Out of the 32 households who treat low quality water, household heads treat the water in 47 percent of the cases while other members of the households do the treatment in 53 percent of the cases. While 16 percent of the households who treat water do so by boiling, 84 percent do so by adding alum. In all the villages, except Gidan Kwano, during the dry season, households are forced to dig shallow holes at the river valleys. The series of shallow wells during this period provide water for the people. In particular, the people of Lunko point to the months of March, April and May to be critical period for water in the village.

BOX 1 - BASIC CHARACTERISTICS OF WATER SEARCH AND USE

Average trip per person in search of water	3
Average distance to water source (rainy season)	210 meters
Average distance to water source (dry season)	500metres to 2.0km
People responsible for fetching water	women and children
Time of fetching water	Morning (55%)
	Morning and evening (29%
	Evening (16%)
Proportion of household who treat water	42%
Who treat water in households that treat water	
	Household head (47%)
	Any other member of household (53%)
Method of water treatment	Boiling (16%)
	Add alum (84%)
Proportion of household who harvest rain water	91%
Method of rain water harvesting	Use of bowl and drum (100%)

Source: Author's field survey, 2010

Water situation in the fringes of Minna may be scored based on Carter (2006) scoring system. Carter suggests a scoring system that ranges form 0 to 2 for a set of five criteria; access to water, water quality, reliability, cost and management. A score of zero indicates very low performance in any of the scoring criteria, 1 will indicate a moderate or fair situation while a score of 2 indicates an acceptable level of performance. Based on this, the water situation in the five villages are assessed as shown in Table 4. It is only in term of cost that the villages have the highest score of 2. In the case of reliability, they score 0, while in the case of access, quality and management, they score 1 each. Overall, they score 4 out of the maximum score of 10. That is 40 percent. In term of scaling, this is a low performance. This will simply put the fringe settlements into other improved water sources. It is an improvement over the unimproved sources but it is still below the top of the ladder occupied by the improved sources. In the face of the apparent poor situation of water in the five communities, women who bear the brunt, generally agreed on irregular flow of water, long queues at water source, long hours of water search and delay in getting children to school as fundamental problems they face in getting water for their households.

TABLE 4 - SCORING OF WATER SITUATION

Criterion	Description	Score
Access to water	Distance is less than one kilometre to most households	1
Water quality	Water sources in largely protected but untreated and often subject of pollution during the period of heavy rains. In one case, the water source (stream) is largely unprotected.	1
Reliability	Seasonal fluctuation is experienced from all sources	0
Cost	The community members contribute minimally to the provision of water	2
Management	Community members contribute to management of water by making financial contributions and ensuring repair of damaged water heads.	1

Source: After Carter (2006)

Sanitation

Three elements of sanitation are examined. These are disposal of human excreta, waste water and solid waste. This is to see the total sanitation of the environment within the five villages (see Table 5). With respect to human excreta, toilet facility is used as a measure of disposal. It is found that majority of the people (68%) depend on open defecation. While one percent has water closet type, 31 percent use pit latrine. The open defecation, by its nature is located outside dwelling units. In general, 89 percent of the households have their toilet located outside their dwelling units. The self-assessment of the toilets shows that 45 percent of the people feel that their toilet facility is of poor quality, while 19 percent feel that the facility is very poor. The two opinions are expressed by 64 percent of the households. This compares with the 68 percent of the people who use open defecation. Under this poor toilet situation, 95 percent of the people wish for a better toilet as opposed to only five percent who feel contented with the present toilet situation. All the people who wish for a better toilet are also ready to

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patronize public toilet. Waste water disposal takes place within the residential compounds (13 % of the households) and around the compound (87%).

The villages also lack drainage facilities. These, in Nigerian villages are luxuries. However, their absence diminishes sanitation quality. Solid waste consists largely of organic matter; 36 percent are of vegetal type, 27 percent are of animal waste and 27 percent are combinations of other organic waste. It is also found that 32 percent of the households dispose their waste along roads and footpaths while 57 percent dispose their waste around their dwelling units. Waste dumps are generally personalized by households. Hence, while for 23 percent of the households, waste dumps are maintained by the community, for 77 percent of the households, waste dumps are maintained by the different households. It is also found that, 64 percent of the people are aware of Wash Hand Campaign.

TABLE 5 - SANITATION CHARACTERISTICS OF THE PEOPLE

Item	Description	Frequency	Percentage
Toilet facility	None (open defecation)	46	68
	Water system	1	1
	Pit latrine	23	31
	Total	75	100
Location of toilet	Within dwelling unit	8	11
	Outside dwelling unit	67	89
	Total	75	100
Condition of toilet	Very good	6	8
	Good	10	14
	Fair	10	14
	Poor	34	45
	Very poor	15	19
	Total	75	100
Wish for a better toile	Yes	71	95
	No	4	5
	Total	75	100
Disposal of waste water	Within the compound	10	14
	Outside the compound	65	86
	Total	75	100
Type of Solid waste	Vegetal matters	27	36
	Tuber covers	6	8
	Food remains	4	5
	Animal waste	18	24
	Combinations of solid waste	20	27
	Total	75	100
Solid waste disposal	Along roads and footpaths	20	32
	Around the house	43	57
	Bush away from the house	8	11
Waste dump management	By community	17	23
	By individual households	58	77
	Total	75	100
Awareness of WASH	Yes	48	64
	No	27	36
	Total	75	100

Source: Author's field survey, 2010

The status of sanitation will have effects on the environment. Respondents were asked to grade toilet facility, water quality and the general environment. The grading is between 1 to 10 to reflect different quality of the three issues. The picture is shown in Table 6. The Table shows that 12 percent of the respondents grade water as being very poor, 32 percent feel that the water quality is fair while 36 percent grade water quality as being good. On the other hand, only five percent grade sanitation as being of good quality while 46 percent grade sanitation as being poor. In general, 69 percent grade the total environment as being of fair quality while 16 percent grade the environment as being poor.

Opinions of some of the community members on the state of water and sanitation reflect the grading shown above (see Table 7). While one person in Lunko observes that 'water and sanitation is fair in the village' , another person observes that 'we have problems in getting water'. Similarly, in Dama, a resident notes that 'We have problems in getting water' and in Epigi, another person says, in respect of sanitation that 'method of disposal is not comfortable and water sanitation situation is poor. These views show the different experiences of the people and perhaps, their frustrations, too.

TABLE 6 - GRADING OF WATER, SANITATION AND ENVIRONMENT BY THE PEOPLE

Item	Percentage of respondents per grading level									
	Very poor		Poor		Fair		Good		Very good	
	1	2	3	4	5	6	7	8	9	10
Water quality	5	7	14	5	19	13	35	1	1	
Sanitation	4		31	13	31	16		5		
Environmental quality		5	11	5	52	17	5	5		

TABLE 7 - VIEWS OF PEOPLE ON WATER AND SANITATION SITUATION.

Village	Views of some community members
Lunko	It is not easy to get and it takes time It needs improvement Water and sanitation is fair in the village We have problems in getting water.
Gidan Kwano	We don't find it difficult to get water because the borehole is close to us Water is available and drinkable. Sanitation needs improvement Water is available but no sanitation. During dry season, there is difficulty of water. Sanitation is done according to households.
Epigi	Method of disposal is poor. But we fetch water, apply alum and cover it up. Method of disposal is not comfortable and water sanitation situation is poor. The water and sanitation condition are very poor. We need improvement in this situation.
Dama	Adequate water from well but seasonal No adequate water because it is seasonal. No adequate water because water from borehole and stream is seasonal.

Source: Author's field survey, 2010

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5. CONCLUSIONS AND RECOMMENDATIONS

It has been demonstrated that the fringe settlements do not have adequate access to water and sanitation. These villages are relatively close to Minna enough to enjoy the fruits of urban life. While daily, they are confronted by the life style of urban dwellers who now move between the city and the villages, the observed inadequacy put the people in a condition of neglect by the city. While water situation is relatively better and can be said to be on the road to improvement, it is sad to note that 68 percent of the people still undertake unimproved sanitation practice. It is safe to say that the people of these settlements are both water and sanitation poor. Average water supply per head is grossly below water poverty line. Water poverty line suggests a minimum requirement of 20 litres a day from a source within one kilometre of the household (UNDP, 2006). While the distance of about 210 metres to households from water source is within reach, the average per capita water yield of less than 10 litres (Table 3) is grossly below the minimum recommended.

The people do not only suffer deprivation, they also experience poverty situation in the consumption of these facilities. It is also easy to see threat to the realisation of the MDG goal on water and sanitation in these settlements. This calls to question, the pattern of expenditure of all levels of government. For example, the Niger State government was said to have spent one billion naira within the last one year on water supply (Daily Independent, February 10, 2010). This is in addition to money spent through the MDG Office and other financial commitment through the Ward Development Project of Niger State government. The threat to the realization of the MDG target also means that there are threats to good living, good health and good environment. Also glaring is the loss of time experienced by women in the search for water. The search for water by women is also a threat to gender equity goal of the MDG. In Lunko village where land scooping for water is practiced during the dry season, land scarification and exposure to erosion is a usual sight. Amidst all these threats, it is discovered that there is an opportunity for cooperative action that could help in addressing the water and sanitation problems in the five communities. The cooperation for the management of existing water sources also means that a little external support could guarantee improved water and sanitation in the communities. For example, the people of Gidan Kwano have initiated moves to get support from their local representative at the National House of Representatives to address the water problem.

The people believe, rightly, that they need more boreholes. It is hoped that governments could build on this internal advantage to provide the necessary lead and support to provide improved water and sanitation for the people. It is important to realize the limitations of providing improved sanitation at the household level by the people. So, it might be important to provide public toilets that will be managed by

the people. Above all, the deprivation suffered in water and sanitation means that the rights of the people to these facilities have been violated. It is imperative that governments must strive to restore these rights. As much as the ward development initiative of Niger State government is commendable, the focus of the initiative must be firmly directed at human development activities that satisfy basic issues of water and sanitation. There is the idea of Community-Led Total Sanitation (CLTS) suggested by Chambers (2009). This is defined as a process where communities, through their own appraisal and analysis, decide to become open defecation free (ODF) and to do this through their own efforts. It is characterised by absence of subsidy and supported only by facilitation from outside. This approach is advocated for these urban fringe communities.

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