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The Scottish Government

Water and sanitation in urban Malawi: Can the Millennium Development Goals be met? A study of informal settlements in three cities

Mtafu A. Zeleza Manda

for

The Scottish Government
&
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ABOUT THE AUTHOR

Mtafu A. Zeleza Manda holds a Master of Science degree in urban development from University College London (UCL), and postgraduate diplomas in housing from the Institute for Housing and Urban Development Studies (IHS) (Holland) and in population from the University of Botswana. He is Director of Alma Consultancy, a private planning and environmental management practice he established in 1998. He has previously worked in the Physical Planning Department and donor-funded projects under the Ministries of Local Government and Lands and Natural Resources in the Malawi Government. In 2003 he helped to found the Centre for Community Organisation and Development (CCODE) in Malawi, and serves as the CCODE board Chairman. He was instrumental in establishing the Malawi Urban Forum and the Malawi Award for Human Settlements.

Mtafu A. Zeleza Manda
Alma Consultancy, PO Box 30193, Lilongwe 3, Malawi
E-mail: mazmanda@yahoo.com; alma.consult@yahoo.com

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Human Settlements Group
International Institute for Environment and Development (IIED)
3 Endsleigh Street
London WC1H 0DD, UK
Tel: 44 20 7388 2117 (international); 020 7388 2117 (UK)
Fax: 44 20 7388 2826 (international); 020 7388 2826 (UK)

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Abbreviations and acronyms

CBO	community-based organization
CCODE	Centre for Community Organisation and Development
CRS	Catholic Relief Services
MDG	Millennium Development Goal
MHPF	Malawi Homeless Peoples' Federation
MIWD	Ministry of Irrigation and Water Development
NGO	non-governmental organization
NSO	National Statistics Office
TSP	Training Support for Partners
UDDT	urine-diversion dry toilet
UNCHS	United Nations Centre for Human Settlements
WFP	Water for People
WHO	World Health Organization
WUA	Water Users' Association

SUMMARY

Introduction

This paper assesses the quality and extent of provision for water and sanitation in urban areas in Malawi – where over 60% of the population lives in informal settlements. It also considers whether the Millennium Development Goals (MDGs) for water and sanitation are likely to be met in Malawi, and examines the current and potential role of community-led sanitation improvements. It includes recommendations for interventions needed by governmental, international and civil-society organizations to improve living conditions of communities to contribute to the realization of the MDGs.

Malawi is one of the world's least urbanized nations, but it is rapidly urbanizing. Poverty in Malawi is manifest in, among other deprivations, poor access to water and sanitation. The government and international organizations have focused more on water supply than on sanitation. Various government agencies have responsibilities for different aspects of water and sanitation and all tend to work independently, as do various civil-society organizations working with international donors who set up and fund their own water and sanitation projects. The Water Department of the Ministry of Irrigation and Water Development is the lead institution in water and sanitation policy development, although it intends to withdraw from implementation to concentration on policy, regulation, monitoring and water-resource management.

For urban areas, water boards are important (Lilongwe and Blantyre each having their own water board) and these are responsible for water supply within their jurisdiction. According to the official Water Policy, they are also responsible for promoting sanitation and enforcing water works by-laws. Water boards are meant to work on behalf of local governments, although they come under the Ministry of Irrigation and Water Development regarding policy, and under the Ministry of Statutory Corporations regarding management direction. Local governments are responsible for sanitation and solid waste collection and management – but prior to the Water Policy, they had no mandate to supply water, although they did construct water kiosks. The Water Policy makes local governments responsible for planning and coordinating water and sanitation programmes within their boundaries, including promoting the role of non-government organizations (NGOs). The local authorities come under the Ministry of Local Government and Rural Development. The newly approved National Sanitation Policy places responsibility for sanitation under water boards. Thus, there is confusion regarding the relative roles and jurisdictions of local governments and water boards.

Within local governments, on-site sanitation falls under public health departments, while sewer systems fall under engineering. A draft Sanitation Policy has placed sewer systems under water boards. The Ministry of Health and ministries responsible for lands, physical planning and housing also have roles and responsibilities within water and sanitation. However, government agencies are reluctant to provide basic services to informal settlements because they feel that this would encourage the development or growth of more informal settlements.

The study and its findings

Findings presented in this paper are drawn from a study based on a questionnaire survey conducted in May and June 2008 of 10% of the households in nine low-income settlements. In each of Malawi's three largest cities, Blantyre, Lilongwe and Mzuzu, the same three types of settlement were studied: a planned area that had become a "slum", a squatter settlement, and a settlement developed through community initiative with the Malawi Homeless People's

Federation. In total, 1,178 households were interviewed. The study also included focus-group discussions and key-informant interviews with staff from central and local governments, parastatals, civil-society organizations and water sellers operating water kiosks. The quality of water from different sources was tested, with samples collected from water kiosks, wells, and water-storage containers within homes.

Incomes and housing

Most households in the nine settlements studied had very low incomes: 54% earned between MK10,000 and MK35,000 (US$71–248) per month. Thus, a large proportion of households earned less than US$1 per person per day. A further 28% of households earned below MK10,000 per month, so, for a family of five, this represents less than US$0.5 per person per day. The study also found that 37% of households had six or more members while 18% had five members. Residential plots are congested, with close to two-thirds having between 2 and 10 households sharing toilets and bathrooms that were often inadequate and poorly maintained. Around 59% of households were renting, with almost all the rest being owner-occupiers.

The Centre for Social Concern in Malawi conducts cost-of-living surveys each month and suggests that the minimum income needed for a family of six in Lilongwe, Blantyre and Mzuzu in October 2008 was between MK44,080 and MK46,357. Clearly, most households interviewed had incomes below this.

Water access

Within the nine settlements studied, provision for water was dominated by water kiosks. Of households surveyed, 53% purchased water from kiosks while 26% had individual water connections and 13% bought water from another house plot. But water consumption levels varied considerably: some families bought just one pail of water a week from kiosks, getting the rest of their water from other (unprotected) sources such as shallow wells and rivers for washing clothes and bathing. Kiosk attendants reported that, on some days, water sales were so low as to represent no more than one pail per household served by the kiosk.

Kiosks do not provide a 24-hour service; most are open for only 6 hours a day (3 hours in the morning and 3 hours in the afternoon), and remain closed overnight. Interruptions to supply are also common – during 2008 in Blantyre and Lilongwe, there were several occasions when there was no water in the system for more than a week. Of households interviewed, 23% reported that it took 15 or more minutes to obtain water (in time travelling to and from the water point and queuing), However, for most households, the limited use made of water purchased from kiosks was related to the cost, not the access.

Communal water points were introduced in Malawian cities in the 1980s, to improve provision for water in informal settlements, but there were problems with water-point management and with getting payments. So water kiosks were developed, managed by associations of water users or by water boards. The number of kiosks grew rapidly, for instance in Blantyre from 36 in 1990 to 359 in 2008, with support from the government, UNICEF and some international NGOs. Kiosks may be managed by water boards, city assemblies, community organizations or private enterprises. Water Users' Associations emerged recently as legally constituted community trusts, and they have taken over some of the kiosks previously managed by water boards.

Water costs

The recommended cost for water sold at kiosks is MK1 to MK1.50 for a 20-litre pail, but it is often sold at MK2 to help kiosk attendants balance the books (the attendants have to pay for any water that is unaccounted for). Some kiosks charge considerably more than this (up to MK5 or even MK10 per pail). Water kiosks have to pay water boards for all the water sold and most kiosks struggle to generate the income needed to cover these costs. The urban poor in Malawi are paying prices equivalent to a far higher proportion of their income on water than is the norm in high-income nations.

Sanitation

Only 10% of Blantyre's total population, and 8% of Lilongwe's, live in homes connected to sewers; in Mzuzu, there are no sewers. Most of the people in all three cities rely on pit latrines. For instance, in Lilongwe, 70% of the population uses pit latrines, with 20% using toilets linked to septic tanks.

Within the study areas, 94% of the population used pit latrines, with 4% using toilets with septic tanks. Most households used shared toilets, while 1.4% lacked any form of toilet. Only 27% of households had toilets that were not shared. Of those households sharing toilets, 15% shared with one other household, 13% with two other households and 3% with more than 15 households. Most toilets cost less than MK10,000 to construct, but emptying them was expensive (K9,000–11,000) and it is common for pit latrines to be abandoned and another pit dug. In older houses, several pit holes can be seen in the backyards.

Most housing plots in all nine settlements studied have more than one household living there, and many have more than two households. One of the main ways in which housing in informal settlements has expanded has been through increasing the number of people and households living on each plot. For instance, 8% of plots have between 10 and 55 households.

Several types of ecological or composting toilets are being used increasingly in Malawi (including the arborloo, forsa alterna and urine-diversion dry toilets). The settlements developed by the Malawi Homeless People's Federation have experimented with these, most recently using urine-diversion dry toilets. But generally the urine is diverted into drains or small soak pits and so not used for agriculture. It has also proved difficult to keep rain out of dry toilets – which affects the drying and composting process.

Solid waste disposal

Of the households studied, 42% disposed of their wastes in pits dug within their plots, while 21% threw waste on the road-side or in a river, and 9% used community sites or city tip sites. The city authorities are meant to provide skips but service provision is poor and many settlements are inaccessible to the lorries that provide and collect skips. Most survey respondents (72%) said that they had never seen a city waste-collection vehicle in their neighbourhood.

Meeting the MDGs for water and sanitation in urban areas

Official statistics for the provision for water and sanitation in Malawi are misleading. Given the very large inadequacies in provision for water and sanitation in Blantyre, Lilongwe and Mzuzu noted above, it is puzzling to find that in 2000, 95% of Malawi's urban population was said to

have piped water and 96% to have safe sanitation. Official statistics also suggest that 96% of Malawi's urban population had access to potable water in 2006 while 97% had access to safe sanitation.

The Government of Malawi has reported that it is making significant progress towards meeting the Millennium Development Goal (MDG) for water and sanitation and is confident that it can achieve the MDG by 2015. But it is clear that the official statistics on provision for water do not use the same definition as that specified in the MDG – the proportion of the population with "sustainable access to safe drinking water". The MDG wording for sanitation is more ambiguous, referring to the proportion of the population with access to "basic sanitation". Malawi would be meeting the MDG in relation to sanitation in urban areas only if "basic sanitation" included very basic pit latrines that are shared by households and often poorly maintained.

Recommendations

1) Consensus should be reached on the definition of adequate and safe access to water and sanitation that reflects a quality sufficient to address the most pressing health issues, so that all actors focus on agreed targets and indicators.

2) Public awareness on water and sanitation linkages should be included and emphasized in all development initiatives, for maximum public health benefits within urban poor communities.

3) The setting of water tariffs should be transparent, so that consumers can appreciate water utilities' challenges (including their costs in providing water).

4) Water Users' Associations should develop a governance structure in which the urban poor communities play a role in the delivery and management of water and sanitation. A national network of such associations should be considered to partner government agencies in the delivery of safe and sustainable water and sanitation.

5) National water and sanitation development should be more balanced in terms of investment for the full realization of anticipated public health benefits. At present, both the government and international agencies focus on water and give little attention to sanitation.

6) Government approval of the National Sanitation Policy, and therefore the establishment of a sanitation services department, should be speeded up to harmonize sanitation management.

7) The adoption of sanitation technologies within low-income communities requires appropriate designs and applications.

8) Upgraded services in urban poor communities are urgently required, along with new housing to reduce overcrowding in existing settlements.

9) Further research is needed on the design of messages and campaigns on hygiene awareness for urban poor communities.

1 Introduction

1.1 Background

Malawi is one of the least urbanized nations in Africa, with a total population of 13.1 million in 2008, up from 10 million in 1998. Only about 20% of the national population lives in areas classified as urban. However, with growth rates estimated at between 4.7% and 6.3% per year, the country is among the world's fastest urbanizing. The urban population increased by 63% between 1987 and 1998 (as shown in Table 1). The national population growth is also very rapid, at 2.8% per year, forcing many rural dwellers to urban settlements in search of a better life. As a result, between 2010 and 2030, Malawi's urban population is expected to double.

The reasons for rapid urbanization relate both to high natural increase and to rural–urban migration, triggered by reduced income and food from farming on fragmented land parcels. Attempts have been made since the 1970s to establish traditional housing areas (site-and-service schemes) with minimum standards and to develop small-to-medium towns so as to divert rural–urban migrants away from major cities. These efforts did not succeed because of limited funds. Developed traditional housing areas have grown into slums, while only a few small-to-medium towns were funded. The four main cities of Lilongwe, Blantyre, Mzuzu and Zomba together account for 76% of Malawi's urban population.

The history and development of these cities varies, but they share common problems in terms of housing provision for the poorest households. In general, poverty affects 52.4% of the people of Malawi – that is, this proportion earns less than MK16,165 ($130) per year (NSO, 2005a) – reflecting the country's position at 164 out of 177 on the human development index of 2007. However, if the international definition of poverty as earnings of less than US$1 per person per day, or US$360 per year, is used, up to 65% are poor.[1] While the Government of Malawi suggests drastic poverty decline to 45% in 2006 and to 27% by 2015, hence meeting Millennium Development Goal (MDG) 1 on eradicating extreme poverty (Malawi Government, 2007b: 6), evidence for this in low-income housing areas is lacking. Consequently as the population urbanizes, the urbanization of poverty becomes obvious through, among other characteristics, informality, overcrowding, poor sanitation and lack of access to clean water. Recently, the government confessed that the sector needed over $125 million to enable urban populations in major cities and small towns access to safe water and sanitation in line with the MDGs.[2]

The housing policies and actions of the various public, private and voluntary players have addressed particular problems and issues with some success. However, they have failed to deal effectively with the problems of the poorest, in terms of service availability for basic sanitation, water provision and waste management. These defects cause serious risks to the health of both existing and new migrants to the cities. In Malawi, despite its low level of urbanization, over 60% of the urban population lives in informal settlements (compared to under 50% in the 1970s).[3]

[1] *Blantyre City Situation Analysis of Informal Settlements* report, 2006.
[2] MIWD (December 2008: 13) Water and Sanitation Sector, Joint Sector Review Report, Lilongwe.
[3] *Blantyre City Situation Analysis of Informal Settlements* report, 2006.

Table 1: Malawi urban population, 1987–2020

Urban centre	1987	1998	2005 (estimated)	2008	2010 (estimated)	2020 (estimated)
Mzuzu	44,217	86,980	134,399	128,432	175,061	270,000
Lilongwe	223,318	440,471	669,114	669,021	863,538	1,324,314
Blantyre	333,120	502,053	711,233	661,444	884,124	1,274,564
Zomba	43,250	65,915	101,423	87,366	131,628	202,076
Other	209,486	298,016	-	-	-	-
Malawi	853,391	1,393,435	-	-	-	-

Sources: NSO (2000), NSO (1993), NSO (2003), *Population and Housing Census Reports* for 1998, 1987, 2008 and *Population Projections Report 1999–2023*.

1.2 Aims and objectives of the study

Aims of the study

The study on which this paper is based was undertaken to determine the status of water and sanitation provision in low-income housing communities in urban Malawi. This was done by reviewing the institutional arrangements affecting delivery of water and sanitation, and to contribute to the debate on strategies for meeting Millennium Development Goals related to water and sanitation.

MDG 7, targets 10 and 11, aspire to reduce by half the population without access to safe water and sanitation by 2015 and to improve significantly the lives of people in slums by 2020. In Africa this has recently gained momentum. The 11th Summit of the African Union had the theme "water and sanitation", to scale up efforts in meeting water and sanitation MDGs by giving the subject its deserved political attention.[4]

Given this initiative, the study also attempted to analyse the extent to which community-led improved sanitation technologies (such as eco-toilets) can be relied upon in protecting the water supply on which poor urban communities rely. In doing this, the study also sought to ascertain the acceptability of such methods among the urban poor.

While several studies have been undertaken in this sector, not much attention has been paid to urban low-income areas where communities suffer despite, in some instances, service availability and consequently have to find coping measures to survive. The study was planned to provide public information as a basis for redefining the thinking about shelter solutions for the urban poor through policy review in order to achieve MDG 7 in Malawi.

Specific objectives

1 To undertake a situation analysis of housing, especially water and sanitation provision, in poor urban communities through a review of policy and institutional arrangements affecting delivery of water and sanitation.
2 To identify and work in selected poor urban communities, consulting on a structured basis with local households, and drawing on their knowledge, experience and views on the effectiveness of various water and sanitation initiatives.
3 To identify key stakeholders, and examine how policies and practices of public, private and voluntary organizations influence and shape delivery of water and sanitation.

[4] *Daily Times* newspaper, 30 June 2008.

4 To analyse the types and forms of organizations of the urban local communities and relationships between these communities and the authorities responsible for planning and providing water and sanitation services.
5 To determine the factors, including costs, affecting the access of urban poor communities to water and decent sanitation.
6 To discuss and analyse in detail the comparative standards pertaining in the traditional housing areas, and planned and squatter settlements within the cities, and to place the experience of the Malawi Homeless People's Federation Villages in this wider context.
7 To assess the effectiveness and sustainability of community-led water and sanitation initiatives, and investigate how these can be scaled up and supported by authorities in Malawi.
8 To recommend to the Malawi planning authorities and service providers, and NGOs, in the water and sanitation sector the changes that can lead to an upgrading of the basic standards in the poorest housing areas.

1.3 Brief literature review

A review of literature both globally and locally highlights three broad issues in water and sanitation. First, there is variation in the definition of access to water and sanitation. Second, both donors and national governments emphasize water supply and neglect sanitation, despite the close linkages between the two, resulting in the much reduced policy and legal framework for sanitation compared to water supply. Third, there is a gap between knowledge and practice on personal hygiene, the major link between water and sanitation, within communities. These three issues are discussed in the following sections.

What is adequate or improved access to water and sanitation?
There are various definitions of access, according to who defines it. The debate is around availability, quantity, distance, time taken to access the facility and types of facilities. What is clear however is that there is no agreement on definitions of "potable," "basic", "safe" and "proper". Official statistics for water and sanitation provision in the urban areas of many low- and middle-income nations indicate very good provision in many cases (Table 2).

Table 2: Official figures for urban water and sanitation coverage, year 2000 (percentage of population)

Country	Urban water coverage	Urban sanitation coverage
Bangladesh	99	82
India	92	73
Kenya	87	96
Tanzania	80	98
Zimbabwe	100	99
Malawi	**95**	**96**

Sources: WHO and UNICEF (2000) *Global Water Supply and Sanitation Assessment Report, 2000*, cited by Satterthwaite (2003); for Malawi figures, see WHO (2000: 167–172).

Satterthwaite (2003) has questioned the validity of officially reported statistics in cities like Nairobi and Dar es Salaam. For example, official statistics indicate that Nairobi, with nearly 50% of its population in informal settlements, had 96% of its population with access to adequate sanitation. In reality, there were cases in informal settlements where 200 households shared single pit latrines. It is unthinkable that Malawi could achieve the coverage officially reported,

considering the low investment in sanitation and actual poor conditions of the sanitary measures in urban poor communities or indeed at city level, where (as will be discussed below) only under 10% of the urban population is served with sewers.

What is adequate access to water?
Access to water is defined by the World Health Organization (WHO) as "the availability of 20 litres per capita per day at a distance no longer than 1,000 metres" (WHO/UNICEF, 2000, cited in Hillbrunner, 2007). According to Tsoka et al. (2002), Malawi adopted this definition in 1990. Gleick (1996, cited in WaterAid, 2007) recommends 50 litres per person per day. Recent government documents use a distance of 500m as signifying adequate access to water.[5] Variations in definitions lead to differences in reported data (see Table 2).

In defining "access" it should be noted that housing is a right defined by article 25 of the Universal Declaration of Human Rights and article 11(1) of the International Covenant on Economic Social and Cultural Rights. The committee on Economic Social and Cultural Rights elaborates by stating that the right to housing does not just mean shelter viewed as a roof over one's head or a commodity but includes, among other things, access to basic services and facilities (UN HABITAT, 2002: 1, 5). Therefore the right to housing includes access to adequate water and safe sanitation. According to the MDG Task Force on water and sanitation, "safe drinking water" means water of acceptable quality and quantity for hygienic purposes (Millennium Project, 2004: 6). It can also be mentioned that the United Nations affirmed the Right to Water in 2002. The Committee on Economic, Social and Cultural Rights of the United Nations Economic and Social Council stated through general comment number 15 that "the human right to water entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses" (Millennium Project 2004: 13).

As shown in Table 3, clearly conflicting figures are reported. Contrary to the observation by Chilinde et al. (2008) that access to piped water in Malawi is declining, from the reported 17% in 2000 and 14% in 2004, the 2007 figure of 16.6% reported by the Multiple Indicator Cluster Study (NSO, 2007) suggests that issues of definition play a significant role in reported data, leading to "confusion and unnecessary debates" (Gutierrez, 2007). It is no surprise that the Malawi Government reports that it is making significant progress in meeting the MDG related to water and sanitation. The government has announced that it is confident of achieving and surpassing the MDG target on water by 2015, of 75% access to potable water, by reaching 90.7% (Figure 1) (Malawi Government, 2007b: 29–33; 2008b: 35–38).

[5] For example, the Joint Sector Review Report defines 'access to safe water' as the number of people with minimum quantity of 27 litres of potable water (water free from disease causing organisms, dangerous chemicals or objectionable colour or odour) per capita per day obtained within a maximum one-way walking distance of 500 metres. (MIWD, 2008: 26)

Table 3: Conflicting data on access to potable water for Malawi (percentage of population)

Year	Rural	Urban	Malawi
1990	47	85	52[6]
1992	42	89	47
1994	43[7]	-	-
1995	44	92	48
1998	-	-	37[8]
1999	-	-	57
2000	58	85	62
2002	62	96	67[9]
2004	62[10]	98[11]	-
2005		25[12]	66.4[13]
2006	71.3	96.2	74.2[14]

Sources: Tsoka et al. (2002: 7), citing GOM (1991), NEC (2000b), and please see footnotes.

Figure 1: How wrongly defined indicators can give false hopes

6 National — The Nation — 29 May, 2008

Malawi beats MDG targets on water

by Montfort Misunje

Malawi has surpassed the target for the achievement of water and sanitation for all by 2015 as set in the Millennium Development Goals, Foreign Affairs Minister Joyce Banda said on Monday.

Speaking in Lilongwe during the Africa Day celebrations, whose theme was 'Millennium Development Goals: Water and Sanitation', Banda said according to the MDGs, 74 percent of Malawians are supposed to have access to portable safe water by 2015.

Banda, however, said as of 2006, 75 percent of Malawians had access to clean water.

This, she said, is an improvement from 47 percent in 1992.

"At this rate, our projection is that by 2015, about 94 percent of the population will have access to sustainable water source, which is above the MDG target," she said.

On sanitation, Banda said in 2000, about 81 percent households had access to improved sanitation which rose to 84 percent in 2006.

She said it is expected that 89 percent households in Malawi will have better sanitation by 2015, a feat above the MDGs target of 86 percent.

Water and sanitation is a component of the seventh of the eight MDGs which aims to ensure environmental sustainability.

There are seven years to 2015, the deadline for attaining the MDGs.

To achieve this, Banda said, government embarked on an intensive programme of drilling boreholes, constructing dams and establishing water points which are run by communities.

During the celebrations, which coincided with the South African xenophobic violence, South African High Commissioner to Malawi Ntshadi Mtsheole, who is the chairperson for the African Community in Malawi, apologised for the violence on foreigners.

She further said unity among African countries is needed to achieve MDGs.

MDGs were established by the United Nations at a Millennium Summit in New York, USA in 2000 to end poverty. The meeting was attended by 189 countries.

The other MDGs are eradicating extreme poverty, achieving universal primary education, promoting gender equality and empowering women, reducing child mortality, improving maternal health, combating HIV and Aids, malaria, and other diseases, and developing a global partnership for development.

[6] Tsoka et al. (2002). Note that 40% of the water-supply schemes were non-functional. Access is defined as e within 1000m

[7] WHO (1996: 23).

[8] EAD (1999: 25). Access is defined as a water facility located within less than 500m of households.

[9] Gutierrez (2007).

[10] NSO (2005) 2004 Demographic and Health Survey. However, 44% got water from protected wells, 20% from private and public taps. No record of quantity of water available and seasonal changes in usage was given (NSO, 2005 & ORC Macro)

[11] JMP (2004) cited in Vazquez (2008).

[12] WaterAid (2005: 9). WaterAid's definition of "peri-urban" may not be internationally acceptable as it includes all low-income areas, squatter and informal settlements *within* city boundaries. Reference to urban poor housing areas as peri-urban is used by NGOs and parastatals as a gimmick for sourcing donor funding.

[13] NSO (2005). "Improved water source" was defined as piped water into dwelling, piped water outside dwelling, communal tap, hand pump, boreholes and protected wells.

[14] NSO (2007), noting that 51.4% used boreholes and only 16.6% used piped water.

What is access to safe sanitation?

Access to safe sanitation should be defined in terms of both availability and type of method. The conventional view of the flush toilet always being the ideal solution to faecal disposal has been challenged in recent years as unsuitable for households in poor communities and where water is scarce. There is now considerable support for some types of dry-composting or "ecological" toilets, such as the arborloo,[15] often called "eco-san" toilets. Whereas some proponents are cautious because such eco-san toilets require a certain level of knowledge for effective use, and because some need enough space guaranteed only in rural areas, others argue vehemently in favour. Simpson-Hebert (2007) writes:

> "while there is a tradition in Africa of planting in old pit latrines, a pit latrine is not truly an ecological toilet because its availability for planting is limited to 10 years or so, most of its nutrients from excreta will never be accessible to plants and importantly, pit latrines contaminate the water table, an unlikely event with the arborloo".

Problems with the arborloo in some settings have led to increased use of the more sustainable urine-diversion dry toilet (UDDT, or "skyloo"). While requiring adequate awareness on its use and on hygiene, the UDDT can be constructed in high-water-table locations and in urban settings (Lapid, 2007; Rathnabharathie and Kariyawasam, 2007).

Table 4: Access to safe sanitation in Malawi (percentage of population)

Year	Rural	Urban	Malawi
1994	60[16]		
1998			6[17]
1999			77[18]
2000			81
2002	42	66	46[19]
2004	61	62[20]	80[21]
2005			46[22]
2005		97.3	61.9[23]
2006			86[24]
2007			46[25]

Sources: please see footnotes.

[15] The arborloo and forsa alterna are shallow forms of pit latrine, meant for use for only one year. After a year, the arborloo site is then planted with a tree. The forsa alterna consists of two pits which are used in alternate years. For details see Section 3 below on "Methods of faecal disposal", and Morgan (2007).
[16] WHO (1996: 23).
[17] EAD (1999: 25). Access is defined as safe sanitary facilities located within a convenient distance of dwellings. The low figure was attributed to the dominance of traditional pit latrines.
[18] Tsoka et al. (2002: 1); WaterAid (2005: 9) puts the figure at 50%.
[19] Gutierrez (2007).
[20] WHO/UNICEF (2006: 34).
[21] NSO (2005).
[22] NSO and ORD Macro (2005); WHO/UNICEF (2004) cited in Hillbrunner (2007).
[23] NSO (2005: 93). The Integrated Household Survey defined "proper" toilet sanitation as having either "flush toilet, or VIP, or traditional latrine with a roof".
[24] Malawi Government (2007b: 29).
[25] NSO (2007).

As with access to water, measurements of access to sanitation depend greatly on how these terms are defined, and especially on the difference between "safe", "proper" and "basic" sanitation. The official statistics on sanitation (Table 4) are criticized as overstated. Water for People,[26] for example, maintains that the usefulness of the figures depends on the definition of "safe" or "adequate" sanitation, as almost all the facilities in Malawi are traditional pit latrines that do not prevent faecal–oral disease transmission. (Similarly, Water for People has claimed that statistics for urban water coverage mask the situation in the unplanned settlements, which are excluded from official statistics, or do not account for the significant percentage of non-functioning facilities, currently estimated at about 33% countrywide.)

Gutierrez (2007) notes how divergent definitions of indicators can "cause confusion and unnecessary debate" among donors, government, NGOs and practitioners. Citing the reported figures by Malawi Poverty Reduction Strategy reports of 81.4% of the population having "reasonable access to a latrine", while the 2001 Joint Sector Review reported sanitation coverage at only 10%, he suggests that discussions on appropriate solutions could not even be started as the benchmarks on which to base interventions are contested.[27]

Water supply is prioritized; sanitation is relegated in policy and funding

> "[S]anitation is not where it should be in the list of international targets: near the top of the development agenda. In terms of public interest it lags behind education, health and HIV/AIDS" (Barbara Evans in response to Bostoen in debate on the matter; see Bostoen and Evans, 2008).

This observation is confirmed by a review of policy documents and discussions with officials in Malawi; these suggest also that water supply can be added to the list of public priority interest. This is reflected in emphasis at both policy and funding levels. The Malawi Government priority with regard to funding, even in seeking donor support, remains water supply, while sanitation is neglected or at best left with non-government organizations. The only major government concern in connection with sanitation is hygiene education or treatment of sufferers in cases of disease outbreak.

Chimulambe et al. (2007: 3) note that government expenditure on water and sanitation declined from MK1.8 billion in 2003/04 to MK0.9 billion in 2004/05. According to WaterAid, the 2005/06 national budget provided only 3% (that is to say MK0.9 billion) of the total for water and sanitation, and only 12% (MK108 million) of this was from government's own resources while the rest was from grants or loans. Nearly 97.5% of the budget of MK0.9 billion was allocated for water, while 2.5% or MK22.5 million was for sanitation (WaterAid, 2005: 8). A National Sanitation Policy was drafted only in 2007, and it took over a year to approve it. Legislation for sanitation was disjointed – appearing under the Ministries of Health, Local Government and Water, as well as under city assembly by-laws, and each institution appeared to expect the others to handle the matter.

A clear example of prioritization of water and relegation of sanitation is noted in the National Water Development Programme (NWDPII) submitted to the World Bank for funding in 2007. Although the purpose was clearly that of "improving water supply and sanitation" in low-income

[26] info@waterforpeople.org (accessed 13 July 2008).

[27] In Lilongwe, one kiosk is meant to serve 50 households or 250 people. Lilongwe city has a total of 566 kiosks serving about 141500 people. An estimated 470,000 people live in low income areas, hence only 30% are served with clean water in these areas. Of course, a few have individual connections; the rest have to find alternative sources.

areas of Lilongwe and Blantyre, there is little mention of sanitation. The document covers mainly cost estimates for reticulation and tariffs proposals.[28] Sanitation measures are incorporated only for purposes of hygiene sensitization rather than investment. As such sanitation is less monitored than water despite the close linkage between the two. This manifests itself in low coverage of sewer networks in urban areas, and the dominance of pit latrines.

Several reasons are advanced for the neglect of sanitation, such as limited funds, but as observed by WaterAid UK, the root cause of lack of progress in the sanitation sector is political neglect: sanitation "is given low priority by donor and recipient governments alike. In sub-Saharan Africa, at current rates of progress, the 2015 MDG target for sanitation will not be met until 2076."[29] In the same report, WaterAid ranks Malawi lowest of 12 countries in prioritization of sanitation, despite Malawi's report of the highest coverage of 61%, against Senegal with the highest ranking in prioritization of sanitation, and reported coverage of 57%.

Box 1: Extreme neglect of sanitation

Further evidence of the relative neglect of sanitation is apparent in one of the areas near the study area of Mchesi in Lilongwe. Biwi Primary School was built in 1983 with four toilet blocks for 2,300 pupils. In 1995 a community secondary school opened on the same site. The toilets were used by both schools and also by the surrounding communities, but became blocked in 2003. For five years, the schools remained without any toilet facility, forcing pupils to use the nearby woodlot, and leading to a high drop-out rate among female pupils. As the government took no action, school teachers requested public support by organizing walks to raise funds for toilet construction.

Source: *The Nation* newspaper, 21 July 2008; "Two Lilongwe schools without toilets for five years".

The gap between community knowledge and practice

The literature indicates that there is a gap between knowledge and practice in relation to hygiene in Malawi.

- According to CRS (2007), more than 82% of households studied knew the importance of hand-washing but more than 56% did not have hand-washing facilities.
- A study by the Sanitation Core Team (SCT) found that 75% of households had soap in their houses, but only 45% used soap for hand-washing at critical times (Malawi Government, 2008: 1).
- Balyeku et al. (2005: 29–30) found that, of those studied, only 37% and 25% washed hands after defecation and after handling children's faeces respectively. This study also found that about 90% of child diarrhoea was due to poor sanitation, lack of access to clean water and inadequate personal hygiene.

[28] See Malawi Government (2007), "National Water Development Programme – investment planning" (draft report).

[29] WaterAid–UK (2008) *Giving Sanitation the Green Light* www.wateraid.org/documents/plugin (accessed 20 August 2008). The countries were ranked on the basis on a 10-point scale: on track for MDGs, presence of sanitation policy, national targets in line with MDGs, sector investment plan, weighting PRSP gives to sanitation, single body for coordination, donors coordinating support, sufficient budget allocation, single budget line for sanitation, performance-monitoring mechanism. For Malawi the only good progress was on the sanitation policy, but it scored badly on 6 indicators and moderately on 4. A maximum of 20 points was allocated fir each country, and the overall score for Malawi was 6, against 19 for Senegal.

Weinger (2008) holds that diarrhoeal disease can be significantly reduced by improvement in three key hygiene practices: hand-washing with soap, household water treatment, and safe storage and disposal of faeces – according to WHO/UNICEF JMP (2004, cited by Malawi Government, 2008: 1), by up to 40%. Childhood mortality in Malawi remains high, at 125 deaths per 1,000 live births, and the prevalence of childhood diarrhoeal disease increased nearly 5% between 2000 and 2004 (NSO, 2005), largely due to poor hygiene practices.

2 Study methodology

2.1 The study areas

The study on which this paper is based was conducted in Malawi's three largest cities: Blantyre, Lilongwe and Mzuzu. Three types of low-income community were chosen: planned areas that had become slums, typical squatter settlements and settlements developed through community initiative. One each of these types of settlement was selected in each city, making a total of nine study areas.

The areas of community initiative are those developed by the Malawi Homeless People's Federation (MHPF). This is a coalition of savings groups formed by the urban poor communities to find solutions primarily to their housing problems. The linking of such groups into a network grows into a federation with support from NGOs to ease linkages with state institutions and professionals. Because of their multiple objectives, such as giving soft loans for small-scale businesses, federations have a wide appeal to many urban poor communities.[30]

Blantyre City
Blantyre, established in 1876, is the largest urban settlement in Malawi, and was the capital until the 1970s. Its primacy declined only after the 1980s due to a decentralized urbanization policy, but it has remained the largest commercial city. Blantyre is one of six cities selected for the millennium cities initiative in Africa. Because of its long history and commercial activity, it has been very attractive to rural–urban migrants. The population of Blantyre reached 502,053 in 1998 and 661,444 in 2008, with an annual growth rate of 2.8%, over a land area of 329 square kilometres. The total budget for Blantyre City development and operational activities for 2007/08 was MK150 million. Informal settlements have proliferated, while planned low-income areas have become slums. The three study areas in Blantyre, as outlined below, are shown in Figure 2A.

- Zingwangwa, a planned settlement that has become a slum, is located between Zingwangwa stream to the west, Soche Road to the north and Zingwangwa Market Road to the east. The total population is recorded as 7,053, comprising 1,410 households of which 141 were sampled.
- The informal settlement area of Misesa is located between Limbe stream to the east, Blantyre Teachers' College to the west and Angelogoveya ("Angels go there") to the north (see Figure 2B). The 1998 population of Misesa was 5,175, with a total of 1,045 households.

[30] Federations have been ably described by, among others, Boonyabancha, S. (2001), "Savings and Loans: drawing lessons from some experiences in Asia", *Environment and Urbanization* Vol. 13, No. 2, pages 9–21; Manda (2007), "Mchenga Urban Poor Housing Fund in Malawi", *Environment and Urbanization* Vol. 19, No. 2, pages 337–359; Weru, J (2004), "Community federations and city upgrading: the work of Pamoja Trust and Muungano in Kenya", *Environment and Urbanization* Vol. 16, No. 1, pages 47–62; VMSDFI (2001), "Meet the Philippines Homeless People's Federation", *Environment and Urbanization*, Vol. 13, No. 2, pages 73–84.

Of these, 105 were surveyed for the study, representing 10% coverage.

- MHPF Angelo village is located at Kanjedza, bounded by Misesa to the south, Blantyre Teachers' College to the west, Angelogoveya to the east and the former Kanjedza forest site to the north. The recorded population is 2,175, with 455 households of which 45 of were sampled for the study.

Figure 2A: Map of Blantyre City showing the study areas

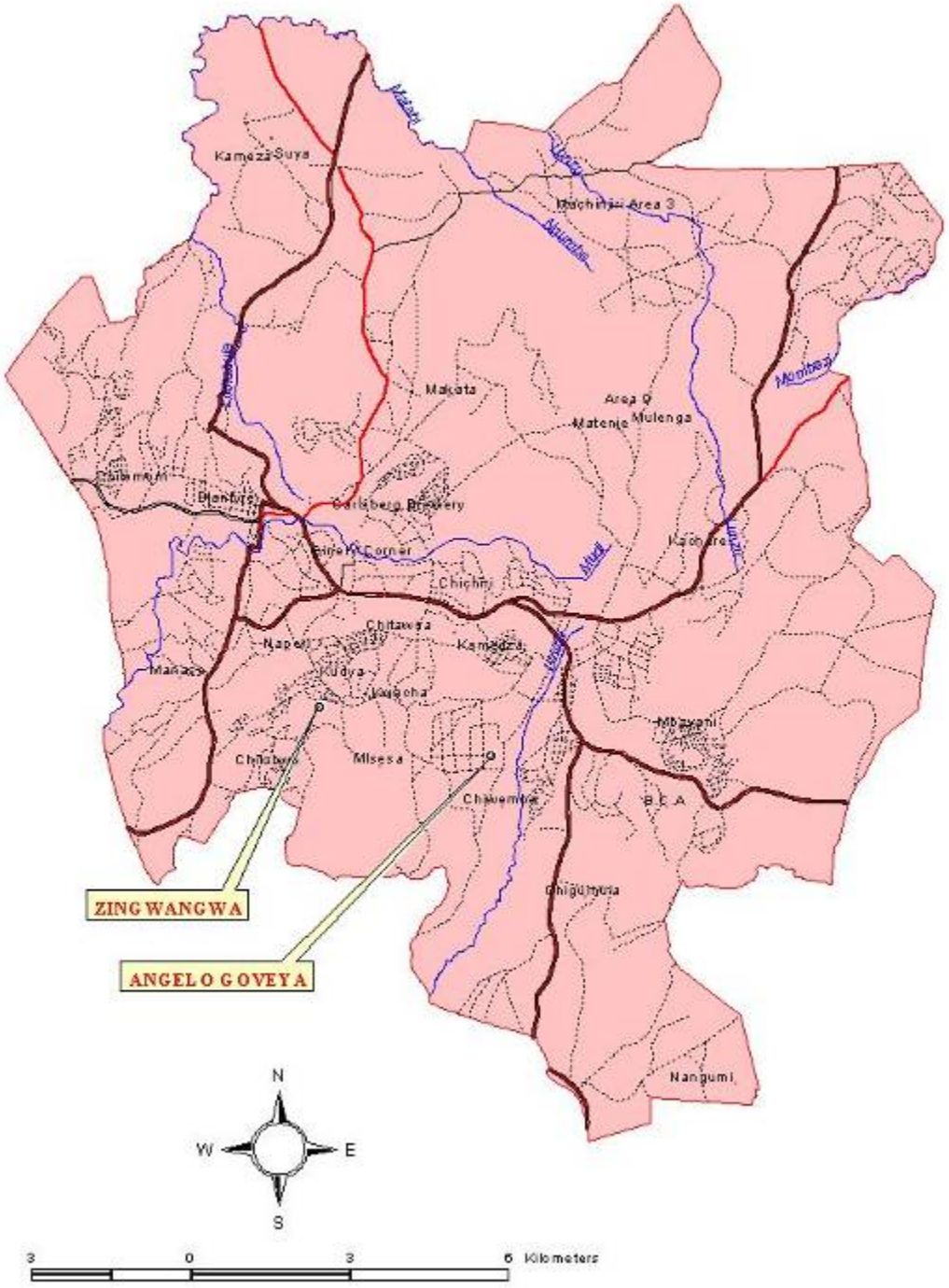


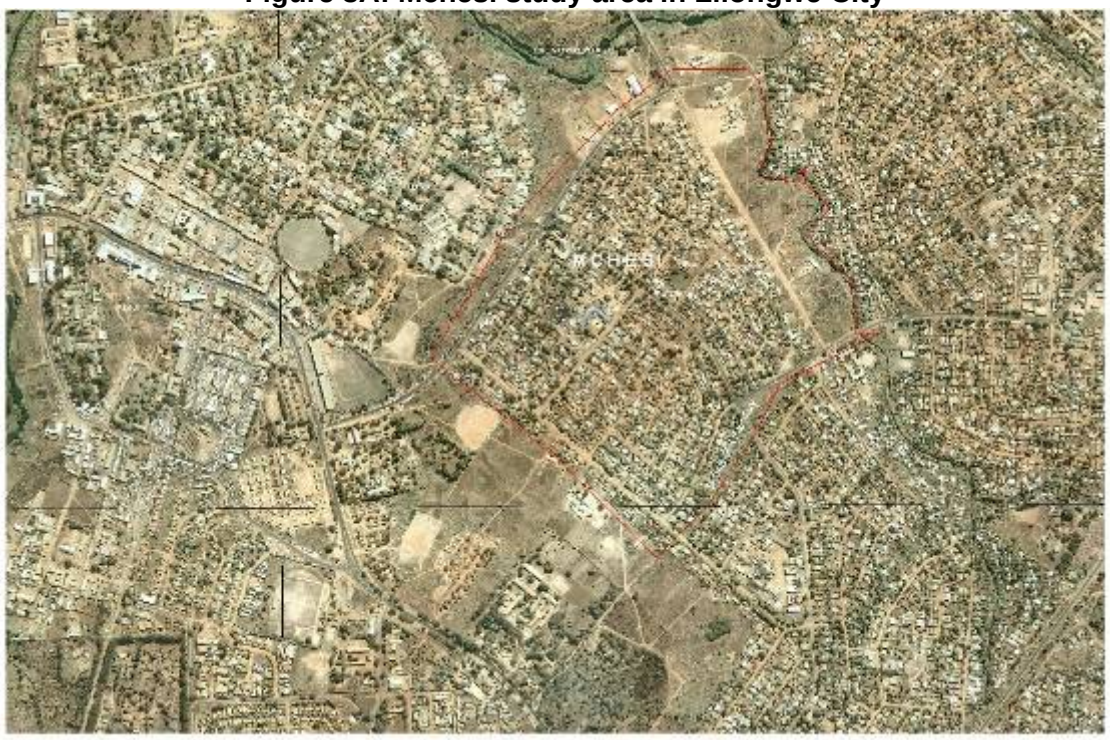
Figure 2B: Misesa study area in Blantyre City

Lilongwe City

Lilongwe became the capital of Malawi in 1975. The decision to develop Lilongwe in the 1960s led to rapid population growth from only 19,000 in 1966 to 440,471 in 1998 to 670,000 in 2008, with annual growth rate of 4.3% up from 2.9% per year. The total land area is 328 square kilometres. The budget allocated by the national assembly for Lilongwe City development and operational activities for 2007/08 was MK141 million, but the city also benefits from the urban infrastructure development fund operated by the Ministry of Lands. The fund is operational only in Lilongwe and is used to fund roads and other services in new middle- and high-income areas. The supply of housing has been affected by unprecedented demand, leading to informality and slums. About 78% of the population lives in low-income areas. After the development of traditional housing areas as early as in 1982, over 10 years passed before new areas were developed, leading to overcrowding in older areas. The three Lilongwe study areas are outlined below, and two are shown in Figure 3A (Mchesi) and 3B (Mgona).

- Mchesi was one of the first planned low-income areas located within a kilometre of the major shopping zone of Area 1 (Old Town) and the Kamuzu Central Hospital. Mchesi is bounded by Area 2 (Indian Quarters) to the north, Biwi to the south and the Central Africa Presbyterian Church to the west. People of Mchesi are generally business-oriented. Prostitution is high is the area. The recorded population of Mchesi is 23,731 with 5,123 households. However, Mchesi is enumerated together with part of Biwi. In the absence of data, the study made a conservative estimate that Mchesi may have two-thirds of the recorded population, that is, 15,821 people and 3,164 households. A sample of 316 households was therefore used.

Figure 3A: Mchesi study area in Lilongwe City



- Mgona is a typical squatter area located in Area 51 of Lilongwe City on land earmarked for industrial development. Mgona is clearly demarcated by the railway line to the north, Nankhaka stream to the east and Nafisi stream to the south. The population is about 14,333. According to Lilongwe City figures, Mgona has a household size of 3.3, and therefore 4,355 households of mainly single families as most of the residents are labourers at the Kanengo (Area 29) and Area 28 industrial sites. Since a household size of 3.3 is extremely low for Malawi, for uniformity a household size of 5 is assumed; the total number of households sampled was therefore 286. A household size of 5 was also used by WaterAid in a recent study within the area.[31]
- Area 49 Federation Village has 965 people in 193 households, of which 19 were sampled. This was the first community housing initiative in the city developed since 2003.

[31] Water Users Day Report for Mgona, Lilongwe City, September 2007.

Figure 3B: Mgona study area in Lilongwe City

Mzuzu City

Mzuzu is the third-largest urban settlement in Malawi. Emerging from a tung estate (a plantation of trees producing edible oil) in the 1940s, it witnessed rapid urbanization following the implementation of the secondary centres development project as part of the decentralized urbanization policy. The population has grown from only 8,490 in 1966 to 86,980 in 1998 to over 128,432 in 2008, over an area of 76 square kilometres. The growth rate is 4.0% per year. As in the other two cities, the shortage of housing is chronic, leading to informality and the growth of slums. The budget allocated by the national assembly for Mzuzu City development and operational activities for 2007/08 was MK91.4 million. The three study areas in Mzuzu, as outlined below, are shown in Figure 4.

- Chibavi is an upgraded low-income area located west of Chibavi/Chibanja dambo and east of Mchengautuwa (white sand) river. The population total for the two wards is recorded as 10,441 in 2,088 households, of which 208 were sampled.
- Salisbury-lines is a squatter area often referred to as Chibanja south. It is north-west of Katoto housing estate, south of Chibavi, and is part of Chibanja Ward. It has a population of some 3,000 in around 600 households, 60 of which were sampled for the study.
- Mchengautuwa Federation Village has a population of 415 in 88 households, 10 of which were sampled.

Figure 4: Mzuzu City, showing the study areas

2.2 Study methodology

The study was conducted using household questionnaires as the main means of gathering data. The 10% samples of households in each of the study areas were selected using simple random sampling methods. A total of 1,178 households (the average household size being taken as 5) was interviewed in nine localities within the three cities (Tables 5 and 6). Population figures were supplied by city authorities or taken from National Census Reports. A new census was underway in June 2008, but its results were not expected until June 2010.

Table 5: Distribution of households interviewed

Mzuzu									**Lilongwe**									**Blantyre**								
Chibavi (East & West)			Fed-eration village			Salisbury			Mchesi			Fed-eration village			Mgona (Area 51)[32]			Zingwangwa			Federation village			Misesa		
Pop	HH	Sample	pop	HH	Sample	Pop	HH	Sample	Pop	HH	Sample	Pop	HH	Sample	Pop	HH	Sample	Pop	HH	Sample	Pop	HH	Sample	Pop	HH	Sample
10,441	2,088	208	415	83	10	3,000	600	67	23,731	5,123	316	965	193	19	14,333	4,355	286	7,053	1,410	141	2175	454	45	5175	1035	105

The household questionnaire survey was complemented by a consultation process in which eight of the study communities were engaged in focus-group discussions. The Zingwangwa discussion could not take place because of a funeral on the arranged date. The focus groups consisted of women, men, local leaders and young people. The questionnaire and group discussions tackled issues of water, toilet usage and personal hygiene in order to link health aspects of life to water sources, consumption and cost.

Information on policy and institutional frameworks was collected through key informant interviews with representatives of central government, local governments, parastatals and civil-society organizations, and with water sellers at kiosks. Crucial information was also collected through observation of the actual situation in the study areas, and a review of published and unpublished literature.

Data relating to water quality were gathered through water testing with the support of staff from the Ministry of Irrigation and Water Development and Northern Region Water Board (Water Quality Assessment section). Water samples were collected from kiosks, wells, and from storage containers in homes within the study locations.

Data were processed and analysed using the SPSS computer software package, using descriptive statistics to generate frequencies and for cross-tabulation that enabled comparison of parameters.

[32] According to a City of Lilongwe information sheet, Mgona has a small household size of 3.3. If the household size was 5, there would be 2,867 households. The sample was based on this figure. But note that 19 questionnaires were not administered.

Table 6: Distribution of questionnaires by township/location

Location	Frequency	Percentage
Chibavi	208	17.7
Salisbury	67	5.7
Mchengautuwa	10	.8
Mgona	267	22.7
Mchesi	316	26.8
Federation Village 49	19	1.6
Misesa	105	8.9
Zingwangwa	141	12.0
Angelo Federation	45	3.8
Total	1,178	100.0

2.3 Constraints of the study

The study was affected by lack of up-to-date population data for the study areas. The last census for Malawi was conducted in 1998. A new census was underway in June 2008, a month after this study, with preliminary results released only in September 2008, after the drafting of this paper. Final results were not expected until 2010. In some study areas, population figures were also affected by unclear boundaries between wards. In these cases, estimates from city authorities were used. In one study area in Lilongwe, part of the target area is enumerated together with a different ward. Elsewhere interviewees were renters or relations of house owners who were unable to respond accurately, leading to missing responses in some instances.

In some locations the frequencies of funerals affected scheduled focus-group discussions and interviews, as all residents of an area are obliged to attend any local funeral. For example, because of the funeral of a family member of one block leader, 19 questionnaires could not be administered in Mgona. In Mchesi, the focus-group discussion was postponed for several days while in Blantyre one focus-group discussion was called off. At the Blantyre Federation village, not all families occupied their houses, and workers lived there instead. Some houses were not completed and four new ones were under construction. The expected total of 464 families does not tally with the number of resident households, as the number of households at the time of the study (455) was itself only estimated on the basis of houses occupied.

3 Study results and discussion

3.1 Institutional arrangements

The main bodies responsible for the provision of water supply in Malawi are the Ministry of Irrigation and Water Development (MIWD), the water boards and city assemblies. The main institutions responsible for sanitation are MIWD, city assemblies and the Ministry of Health and Population. However, water supply and sanitation are also provided by civil-society organizations and international donors who set up and fund their own water and sanitation projects.

The roles and inter-relationships of the various players are not well coordinated with regard to investment planning, project implementation and operation. Specifically, local governments are mandated by the Local Government Act to be responsible for water and sanitation while the

Water Works Act and now the sanitation policy mandates the water boards. This has been cause of conflict between the boards and local governments. According to Water Department, the issue requires understanding by local governments, as any service carried out by the water boards is essentially on behalf of the local governments except that there is need for effectiveness and efficiency in service delivery.[33] Within the local governments themselves, on-site sanitation (pit latrines and septic tanks) are within the remit of public health departments while sewerage sanitation falls under engineering departments. These departments tend to work independently.

This lack of coordination is a major contributory factor in the overall poor performance of the sector, which is failing to deliver safe water supplies to poor people (WaterAid, 2002). The roles of the state players according to mandate from relevant legislation are as outlined in the following section, followed by a section on non-state actors involved in the sector.

State actors in water and sanitation

The Water Department of MIWD is the lead institution in water and sanitation policy development and oversight. The MIWD developed the National Water Policy in 2005 and Sanitation Policy in 2007 and now intends to withdraw from implementation to concentrate on policy, regulation, monitoring, managing and disseminating information on water resources and sanitation. With a total budget of MK5.1 billion for 2007/08, the stated objectives of the MIWD, among others, are: (a) to ensure convenient and efficient access to water of acceptable quality and associated water-related public health and sanitation, and (b) to encourage pricing and charging systems that recognize that water is both a social and economic good and conform to principles of cost recovery.[34]

As a way to show commitment, MIWD embarked in 2008 on a Sector Wide Approach (SWAp) to develop the water and sanitation sector. A working group was formed early in 2008 to propose the governance structures.[35] As a result of this positive trend, a joint funding proposal was submitted to the European Investment Bank and European Union Water Facility. In 2007 the Malawi Government developed a National Water Development Programme estimated to cost $258 million over five years to accelerate progress towards attaining the Malawi Growth and Development Strategy (MGDS) and Millennium Development Goals (MDGs) targets for water and sanitation. The objectives of this programme will be achieved through: providing potable and clean water in Blantyre and Lilongwe through the Blantyre and Lilongwe Water Boards; providing water in town and market centres through regional water authorities; repairing and revamping rural supply and sanitation through existing gravity water systems and developing new systems where none exists.

The National Water Resources Authority is involved in the coordination of catchment management, and prescribing and determining the establishment of water users' associations especially for rural water-supply schemes. It collects fees related to water abstractions and discharges, and issues water abstraction and discharge licences.

[33] Discussion with Mr Gondwe, Director of Water Supply and Sanitation, 2 September, 2008. In Malawi water utilities fall under the Ministry of Irrigation and Water Development for policy direction and funding, and being parastatals also fall under the Department of Statutory Corporations, responsible for staff recruitment, while local authorities are under the Ministry of Local Government and Rural Development.
[34] Malawi Government (2007a: 253–268). Of this total budget, 93.4% was for development of which 14% would be from domestic sources and 86% from donors.
[35] www.waterswap.org (accessed 13 July 2008).

Water boards are established under the Water Works Act of 1995, which allowed for the establishment of five water boards. Two of these, the Blantyre and Lilongwe Water Boards, serve the two cities and their peri-urban areas. The other three boards were established to take over government authority to provide water to the other cities and rural areas. The Northern Region Water Board, Central Region Water Board and Southern Region Water Board were therefore established to operate in the respective regions where the Blantyre and Lilongwe Water Boards do not operate. The Northern Region, Lilongwe and Blantyre Water Boards are responsible for water supply in the study areas. According to the national water policy, the boards are responsible for, among other things, promotion of sanitation services and enforcement of water works by-laws related to the construction of delivery and connection facilities of services for water supply and sanitation in declared water areas.

Before the national water policy, approved in 2005, local governments did not have mandate to supply water to communities, but were responsible for sanitation through their mandate over waste collection and disposal and sewerage development. However, the cities do provide water to low-income communities by constructing water kiosks. The major engagement of cities with sanitation services is the provision of health education and training of health and water committees to obtain maximum socioeconomic benefits from water supply. Due to limited resources and their "illegal status", squatter settlements receive no waste collection service.[36] The Water Policy makes local governments responsible for planning and coordination of the implementation of water and sanitation programmes at local assembly level. Promoting the participation of NGOs in the delivery of water supply and sanitation services appears to create confusion, as the local assemblies referred to are also under the jurisdiction of the water boards.

The Ministry of Health is mandated to promote health and hygiene education in water and sanitation services, provide guidance concerning the quality of drinking water, intervene to prevent the prevalence of water-related diseases, undertake research in water-related health issues, and include activities to prevent transmission of HIV in the water and sanitation sector. The Ministry of Health also has a department that handles environmental health and hygiene.

Ministries responsible for lands, physical planning and housing coordinate and provide the policy and regulatory environment to promote sustainable human settlements and development in both urban and rural areas. The physical planning department especially enhances the provision of water and sanitation. However, in the ministry budget, planning receives very little funding: for example, only 7.9% of the 2007/08 Ministry of Lands and Natural Resources total MK634 million recurrent budget is for physical planning, while the housing programme actually refers to financial allocation for government-office rental fees.

Non-state actors in water and sanitation

Several non-state actors are involved in Malawi's water and sanitation sector. These are mainly international organizations and civil-society organizations that source external funding for water supply (e.g. kiosk construction, borehole drilling), community sensitization and advocacy. The major donors in the water and sanitation sector to Malawi are the World Bank, UNICEF and the governments of Japan, Canada and the Netherlands. The following organizations are significant in the three cities involved in the study.

The World Bank has supported 126 projects in Malawi since independence in 1966, to a total of over US$3 billion. At the end of 2007, the Bank had 15 active projects worth over $461 million. For example, the Community Based Rural Land Development project aimed at resettling rural

[36] Interview with Mr Mulula, Director of Health and Social Welfare Services, Lilongwe City, 13 June 2008.

people to unused and underused estate land, and the Infrastructure Services project supported market linkages through infrastructure development in rural trading centres.[37]While these are rural-based projects, in the urban sector the Bank is supporting the five-year National Water Development Project II, valued at US$144 million, to which the Bank has contributed $80 million. The project aims to achieve 80% water coverage by 2011. The African Development Bank (ADB) will contribute through a US$47 million loan for the National Water Development Project for six rural districts in southern Malawi (plus Lilongwe in the centre) for water and sanitation. The EU water facility and European Investment Bank have approved a grant and loan of 30 million euros for water supply and sanitation in Lilongwe and Blantyre for 2008–2012 to extend drinking-water supply and provide basic sanitation. The Netherlands Government and UNICEF are together funding water projects in 12 districts, with a value of US$16.9 million.

UNICEF, the UN Children's Fund, concentrates on school sanitation and hygiene, integrated and decentralized water supply, sanitation and hygiene promotion through support to district assemblies, NGOs and other local service providers, and support for cholera prevention. UNICEF notes that, despite abundant surface and groundwater resources and a considerable investment in water-supply systems (close to US$73 million), population pressure and deforestation, poor construction standards and inadequate maintenance make Malawi's water supply unsustainable. UNICEF also notes that sanitation is comparatively under-funded, and has been involved in drafting guidelines for gender- and child-friendly latrines, urinals and hand-washing facilities.

Civil-society organizations assist in mobilization and securing funding for low-income communities' water and sanitation projects, community sensitization on water and sanitation, and provision of water supply and sanitation services to low-income groups within urban centres. These include international and local NGOs and community-based organizations (CBOs). The major NGOs most involved in the study areas are WaterAid, Water for People and the Centre for Community Organization and Development (CCODE).

WaterAid began working in Malawi in 2000, through advocacy, partnership and project implementation. In the water sector, WaterAid operates in partnership with the Lilongwe Water Board, Salima and Machinga districts. CCODE and Training Support for Partners (TSP) have also been included in this partnership, to help communities manage existing public kiosks and to promote eco-san toilets. (WaterAid, 2005: 11). In sanitation, WaterAid works with Livingstonia Synod in Mzimba district to promote ecological sanitation.

Water for People (WFP) has also been working in Malawi since 2000, to provide safe drinking water and/or improved sanitation, in partnership with local NGOs (such as the Hygiene Village Project, CCODE and the Livingstonia Synod), and also district assemblies and Blantyre Water Board. Typical water projects in Malawi include boreholes, hand-dug shallow wells, Afridev hand pumps, rainwater catchment tanks, and community tap stands. These projects benefit 200 to 1,000 people each. Sanitation projects include simple pit latrines covered with sanitary platforms. WFP–Malawi has also committed to develop sustainable solutions in unplanned peri-urban areas where populations are growing and basic services are unavailable.

CCODE supports the work of the Malawi Homeless Peoples' Federation by soliciting external support for the effective implementation of community-driven initiatives including the development of housing for members of federations. The federations have established various

[37] www.worldbank.org/mw (accessed 10 September 2008).

small-scale soft loans for the members' benefit. Such loans leverage any externally sourced financing.

A new organization called the Malawi Public Health Association launched a water and sanitation project in the Masasa squatter area of Mzuzu in July 2008.[38] CBOs mobilize and train communities in water-supply management systems and personal hygiene. They also engage in advocacy.

Of all these non-state players only the following were noted to be engaged in the study areas:

- Training Support for Partners took over the work of an NGO called MATAMA to work with communities in Mgona in Lilongwe in partnership with WaterAid, to promote hygiene
- WaterAid is working with local NGOs like CCODE and TSP in developing appropriate mechanisms for sustainable water supply and sanitation among low-income communities; WaterAid was instrumental in the formation of water users' associations
- CCODE works in all three cities but concentrates on mobilizing and training communities in various aspects of housing, water and sanitation
- water boards in the respective areas supply water directly or through water users' associations via community-managed kiosks
- Water for People has a project in Blantyre.

The activities of some of these organizations appear not well known by the communities. For example, in Mzuzu a well-publicized national water development project currently underway had involved detailed studies in the areas surveyed, but several households were not aware that such studies had taken place. What is clear none the less is that the large number of existing and emerging players testifies to the depth of the problems of public health resulting from poor access to water and sanitation, as well as inadequate knowledge of hygiene.

3.2 Policy and regulatory framework

The Malawi Government has several policy instruments on housing, water and sanitation. While water supply is well legislated, there was no legislation on sanitation until the national sanitation policy was drafted in 2007. The players in water, sanitation and hygiene are guided by national development policies and strategies and the Millennium Development Goals (MDGs). Some of the relevant national policies, legislations and development strategies are as follows.

Malawi Vision 2020: developed in the 1990s, the vision outlines the need to achieve improved access to water as a major aspect of development.

The most significant policy document is the Malawi Growth and Development Strategy (MGDS 2006–2011), which was approved in 2007. The strategy recognizes the importance of safe drinking water and sanitation for economic development and therefore seeks to increase access to water within an average distance of 500m from households.

The Malawi National Strategy for Sustainable Development was drafted in 2003 by the Environmental Affairs Department (Malawi Government, 2003) with goals similar to those of the MDGs: (a) to halve by 2015 the proportion of people without safe access to drinking water (even though this proportion has increased from 66% to 84%); (b) to halve by 2015 the proportion of people who lack access to *basic* sanitation; (c) to support local governments in elaborating slum

[38] Capital Radio news broadcast, 7.00am, 13 July 2008.

upgrading within the framework of urban plans; and (d) by 2020 to achieve significant improvements for slum dwellers as proposed by the Cities without Slums initiative.

The National Water Policy was drafted and launched in 1994 but was revised and re-launched in 2005 with its slogan “Water and Sanitation for All, Always”, commitment to which is derailed by the clear disparity between prioritization of water supply and of sanitation measures. The objective of the policy is to achieve sustainable management and utilization of water resources in order to provide water services of acceptable quality and in sufficient quantities that satisfy the requirements of every Malawian.

The National Sanitation Policy was drafted in 2007. The overall policy objective is to achieve universal access to improved sanitation, improved health and safe hygiene behaviour by 2020. The formulation of the policy, which was approved in October 2008, is the first attempt to recognize sanitation as a development issue in Malawi. Hitherto, sanitation was only implied by references in various policies and laws such as city by-laws, the environmental management act, the town and country planning act, water resources law and public health laws. Therefore, different institutions used their own different guidelines and practices.

The National Housing Policy was finalized in 2007 with ambitious provisions for decentralized sustainable housing delivery in which low-income communities would play a significant role. However its implementation is facing unclear challenges. The lead ministry (Housing and Urban Development) suggests the need for “international flavour” to implement the policy. A similar attitude and bureaucratic inertia rendered a previous policy approved by cabinet in 1999 redundant or obsolete even before implementation. Noteworthy here is the apparent confusion with a shelter strategy (currently at profiling stage) that ought to assist in policy implementation.

The National Land Policy was adopted in 2002. Several projects are under implementation under the land reform programme. However, all projects concentrated on rural tenure reforms and capacity building, largely because government considers that urbanization can be controlled through rural development, an approach that has proved futile worldwide. Attempts to upgrade urban slums are viewed cautiously as being politically sensitive, a gimmick that retains the urban poor in the status quo. The land policy advocates tenure regularization and provision of basic services, including water and sanitation. However, unlike in the rural sector, the only initiative for urban areas is a funding proposal to Cities Alliance for the National Slum Upgrading Project. Meanwhile, failure to access land formally and apparent congestion in existing areas forces the urban poor to invade land indiscriminately (Manda, 2004).

The Water Works Act was passed in 1995 to regulate water supply and sanitation services. The Act established and defined the operation of five water boards: Blantyre, Lilongwe, Northern, Central and Southern Region. The Act also mandates the boards to manage sewerage systems (currently under the purview of local governments). The formulation of the policy, review of the Act and establishment of the water boards was supported by the World Bank during 1994–2003. There are proposals for a Water Supply and Sanitation Services Act to give more independence to water boards and to allow for more partnerships (Vazquez, 2008: 20).

The Local Government Act was passed in 1998. With the associated Decentralization Policy, this was seen as a major step to promote local governance, but the refusal by government to hold local government elections since 2005 has drastically eroded enthusiasm for participatory local governance. Elected positions have since been entrusted to appointed government officers and chiefs.

Under current planning arrangements in Malawi, low-income housing is catered for under the public health legislation, reflecting the historical development of planning and housing from the viewpoint of public health. Under the review of land-related law, low-income planning and housing provisions will be removed from the Public Health Act and incorporated into the Physical Planning Act. The physical planning bill itself awaits approval by cabinet and parliament.

The inability of the relevant institutions and regulatory bodies to enforce legislation is a major hindrance to success on safe sanitation. This makes some stakeholders unwilling even to adhere to statutory duties.[39] A major problem relating to adequate safe water and sanitation in low-income areas relates to their informal or illegal status. According to Mulula,[40] since most of the low-income areas are informal, "there is reluctance by authorities to formalize them by providing basic services, as it is believed that this would merely encourage the establishment of more informal settlements", in addition to the fact that insecurity of tenure makes such communities unwilling to invest as they fear eviction. Furthermore, although water to low-income communities is subsidized, the subsidy results in prices still too high for many residents. There is no other mechanism to resolve this to ensure safe water, hygiene and sanitation for poor communities,[41] as the water boards are commercially oriented.

3.3 Socioeconomic characteristics of surveyed households

The study on which this paper is based was carried out in three low-income communities in each of Malawi's three largest cities: Blantyre, Lilongwe and Mzuzu. In each city, the survey covered one squatter settlement, one planned housing area that had become a slum and one village built by the Malawi Homeless Peoples' Federation. Within each of these nine communities, 10% of households were surveyed (a total of 1,178 households) using a questionnaire covering water supply, sanitation, solid-waste disposal and hygiene knowledge and practice. The survey also covered education and income, and housing characteristics, as discussed in this section and the next.

The study found that education levels of residents of the low-income communities surveyed were not as low as might be expected for a country with an overall adult literacy rate of 64%. Over half (52.5%) of the interviewees had secondary education and 36.8% had received only primary education. Only 5.3% lacked any education (Table 7).

Table 7: Highest education level of head of household

Level of education	Frequency	Percentage
No response	2	0.2
University/college	45	3.8
Secondary	618	52.5
Primary	433	36.8
Adult literacy	18	1.5
None	62	5.3
Total	1,178	100.0

[39] Interview with Mr Mulula, Director of Health and Social Welfare Services of Lilongwe City, 13 June 2008.
[40] Interview conducted on 13 June 2008.
[41] Report on the Workshop on Integration of Water Sanitation and Hygiene into HIV/AIDS Home-Based Care Strategies October 29 – November 1, 2007, Malawi.

Household incomes were very low. Most of the families (54.2%) reported earnings of between MK10,000 and MK35,000 (US$71–250) per month, equivalent to between US$2.3 and US$8 per day per family. While 4.1% did not respond to the question, 27.5% reported earnings of less than MK10,000 per month for their families (Table 8). For families with more than five members, this suggests daily earnings of about MK67 or US$0.5 per person. This finding appears not remarkably different from findings of the Integrated Household Survey (IHS) that measured 25.4% of urban Malawians as poor. The IHS also found that urban residents earned an average of MK524 per household (K105 per person) per month or $0.75 per person per day (NSO, 2005a: 65).

The Centre for Social Concern conducts monthly cost-of-living surveys, assessing the cost of basic food and non-food items (minimal requirements for charcoal, bath soap, lotion, Vaseline, water, electricity and housing rentals) for a family of six. In the cities of Lilongwe, Blantyre and Mzuzu for October 2008, the cost of these essentials was MK46,357, MK45,826 and MK44,080 respectively. This can be compared with monthly wages of MK3,000–5,000 for security guards, MK5,000–10,000 for shop attendants, MK15,422–17,203 for school teachers and MK32,893–37,275 for nurses.[42]

[42] Centre for Social Concern (2008), "Basic Needs Basket: Lilongwe, Blantyre, Zomba and Mzuzu, October 2008"; see *Malawi News*, 8–14 November 2008. The figures are based on surveys conducted between 21 and 27 October 2008 in the four cities.

Table 8: Monthly income of household by city and township/location

City/ township	Mzuzu			Lilongwe			Blantyre			Total number	Percentage
Income (MK)	Chibavi	Salisbury	Mchen-gautuwa	Mgona	Mchesi	Federation Village 49	Misesa	Zing-wangwa	Angelo Federation		
No response	2	1	0	18	20	0	2	4	1	**48**	4.1
< 10,000	45	26	4	105	70	7	34	19	14	**324**	27.5
10,000–35,000	128	32	6	131	174	10	61	70	26	**638**	54.2
35,000–50,000	14	5	0	7	30	2	4	32	2	**96**	8.1
> 50,000	19	3	0	5	22	0	4	16	2	**71**	6.0
2,500	0	0	0	1	0	0	0	0	0	**1**	-1
Total	208	67	10	267	316	19	105	141	45	**1,178**	100

3.4 Housing conditions

The study attempted to determine tenure arrangements, crowding and the extent to which communities liked their locations. As shown in Table 9a, more than 37% of the households had 6 or more members living together; 16% of households had 3 members, 22.1% had 4 members while the standard household size of 5 members accounted for 17.7%.

The study also attempted to find out the number of households on each plot, as this would help to understand accessibility to water and sanitation. It was found that only two of the surveyed plots contained single households and that most plots, irrespective of whether they were in planned or squatter locations, except in the federation villages, had more than one household. At least 7.6% of plots overall had between 10 and 55 households, but there were plots with 25, 27, 32, 35, 36 and 55 households, all of these in Mchesi (Table 9b and Box 2). In Mzuzu there were nine plots each occupied by 4–7 households, while in Blantyre the highest occupancy rate was 15 households on one plot. A total of 757 plots had between 2 and 10 households, representing 64.3% of the sample. (For nearly 30% of the households surveyed, there was no response to this question.)

Box 2: Mchesi housing: extreme overcrowding

In Mchesi in Lilongwe, one plot (HH 75) was noted to have 55 households sharing a single toilet and four bath shelters. Each household paid monthly rent of MK1,400, MK170 for water and more for electricity to the property owner. The resident interviewed collected about 6 pails of 20 litres each day for his family of four members. Now at 41 years of age, he has been in Mchesi for 32 years. Because of past experience he keeps all records of numbers of family members in each household, payment for water (including number of pails), electricity and rent so that the house owner does not cheat them on bills or refuses to take responsibility when authorities disconnect power or water.

Table 9a: Number of people per household by city and location

City/ location	Mzuzu			Lilongwe			Blantyre				
Number	**Chibavi**	**Salisbury**	**Mchen-gautuwa**	**Mgona**	**Mchesi**	**Federation Village 49**	**Misesa**	**Zing-wangwa**	**Angelo Federation**	**Total**	**Percentage**
No response	0	0	0	1	0	0	0	0	0	**1**	0.1
1	2	0	0	3	4	0	1	2	1	**13**	1.1
2	5	2	0	22	20	0	4	5	5	**63**	5.3
3	36	9	2	50	48	3	18	19	4	**189**	16.0
4	39	14	3	58	71	4	22	38	11	**260**	22.1
5	41	9	2	50	48	6	22	23	8	**209**	17.7
6	33	17	1	38	48	2	17	19	7	**182**	15.4
7	19	6	0	23	31	3	14	20	4	**120**	10.2
8	14	8	1	12	19	0	2	7	2	**65**	5.5
9	7	2	1	6	10	1	1	2	1	**31**	2.6
10	9	0	0	0	8	0	1	2	1	**21**	1.8
11	0	0	0	0	3	0	1	1	0	**5**	0.4
12	2	0	0	4	4	0	0	2	1	**13**	1.1
13	0	0	0	0	1	0	0	0	0	**1**	0.1
14	0	0	0	0	1	0	1	0	0	**2**	0.2
15	1	0	0	0	0	0	1	0	0	**2**	0.2
16	0	0	0	0	0	0	0	1	0	**1**	0.1
Total	208	67	10	267	316	19	105	141	45	**1,178**	100.0

Note: Table 9a shows number of persons living in each dwelling unit. Some of the dwelling units are rooms within several houses on one plot. For example, there was 1 household in Zingwangwa that had 16 persons living together; there were 13 households (representing 1.1% of those studied) that had a person living alone.

Table 9b: Number of households living on each plot by city and township/location [43]

City	Mzuzu			Lilongwe			Blantyre			Total	Percentage
Location	Chibavi	Salisbury	Mcheng-autuwa	Mgona	Mchesi	Federation Village 49	Misesa	Zing-wangwa	Angelo Federation		
No response	105	27	8	42	41	18	33	34	44	**352**	29.9
1	0	0	0	1	1	0	0	0	0	**2**	0.17
2	56	18	0	42	20	0	20	14	1	**171**	14.5
3	28	13	0	44	30	0	20	14	0	**149**	12.7
4	12	5	0	43	37	1	10	19	0	**127**	10.8
5	4	2	0	32	30	0	11	21	0	**100**	8.5
6	1	0	2	20	37	0	5	13	0	**78**	6.6
7	1	2	0	13	32	0	1	4	0	**53**	4.5
8	0	0	0	6	22	0	2	10	0	**40**	3.4
9	0	0	0	2	8	0	3	2	0	**15**	1.3
10	0	0	0	6	15	0	0	3	0	**24**	2.0
11	0	0	0	2	7	0	0	0	0	**9**	0.8
12	0	0	0	4	2	0	0	1	0	**7**	0.6
13	0	0	0	1	6	0	0	2	0	**9**	0.8
14	0	0	0	2	4	0	0	3	0	**9**	0.8
15	0	0	0	4	6	0	0	1	0	**11**	0.9
16	0	0	0	3	6	0	0	0	0	**9**	0.8
17	0	0	0	0	1	0	0	0	0	**1**	0.08
18	0	0	0	0	2	0	0	0	0	**2**	0.17
20	0	0	0	0	2	0	0	0	0	**2**	0.17
23	0	0	0	0	1	0	0	0	0	**1**	0.08
25	0	0	0	0	1	0	0	0	0	**1**	0.08
27	0	0	0	0	1	0	0	0	0	**1**	0.08
32	0	0	0	0	1	0	0	0	0	**1**	0.08
35	0	0	0	0	1	0	0	0	0	**1**	0.08
36	0	0	0	0	1	0	0	0	0	**1**	0.08
55	0	0	0	0	1	0	0	0	0	**1**	0.08
Total	207	67	10	267	316	19	105	141	45	**1,177**	100

[43] There was an error in data entry: the total number of questionnaires was 1,178 rather than 1,177 as shown.

In Malawi, the construction of several structures on one plot is widespread, and similar situations are noted elsewhere within Southern Africa. For example, a study by Kalabamu (2006) in Botswana showed that many urban poor communities were overcrowded in low-income areas where they rented rooms on over-developed plots because they could not acquire land and build separate houses. In some cases up to 15 households lived on one plot, with sometimes about 6 houses separated by narrow spaces and sharing a toilet and tap.

The study also found that 58.6% of households rented, while 39.7% owned the houses they occupied (Table 10). A high percentage of renters implies that issues of sanitation are more likely to be neglected as the occupants lack the incentive for any investment. In any case, when the owner makes improvements, this is accompanied by an increase in rent that can force out the tenant. Only 1.7% lived rent free. The Integrated Household Survey mentioned above found that 50% of the urban population did not own houses they occupied (either they rented or lived rent free) and that only 42% of houses were owner-occupied (NSO, 2005a: 78; 80). Over the years the number of people renting has been increasing. For example, the statistical yearbook compiled by the NSO (2007) indicates that in all urban areas in Malawi 54.9% rented while 39.5% owned houses and 5.5% lived rent free.[44]

While 5.6% of residents surveyed had lived in the same area for all of their lives, 28% had stayed for over 10 years and 65.8% had been there for less than 10 years (Table 11). Frequent transfers suggest residents' dissatisfaction with the location and the houses. Among the reasons for this could be poor water supply and sanitation.

Table 10: House ownership by households

Tenure status	Frequency	Percentage
Own	468	39.7
Rent	690	58.6
Live rent free	20	1.7
Total	1,178	100.0

Table 11: Duration of stay in the location

Duration	Frequency	Percentage
Not sure	3	.3
Born here/ever since	66	5.6
Under 10 yrs	775	65.8
Over 10 yrs	333	28.3
32	1	0.1
Total	1,178	100.0

3.5 Water supply and access

The provision of safe water in poor urban communities such as those under study is dominated by the kiosk system. This was introduced to ensure regular and affordable supply in traditional housing areas and squatter settlements when the government launched the Urban Communal Water Point Project in 1981, with financial and technical assistance from the United Nations

[44] NSO (2007: 53) Statistical Year Book, Zomba. Figures for Blantyre were 53.1% renting, 41.9% owning and 5% rent free, for Lilongwe figures were 58.1% renting, 36.4% owning and 5.5% rent free while for Mzuzu 53.9% rented, 35% owned and 10.4% lived rent free.

Capital Development Fund and the World Health Organization (WHO). The objective of this initial project was to construct 600 communal water points in 50 urban settlements in Malawi, in order to provide affordable and safe drinking water to over 24,000 low-income urban families (Fabiano, 1993).

Although, this objective was achieved in 1985, problems developed with water-point management and people stopped paying the tariffs to the local tap committees. When a new phase was started in 1988, the Piped Supplies for Small Communities (PSSC) Project, the objective shifted from mere supply to development of more appropriate, sustainable and successful methods to plan, implement and manage piped water supplies with rural and peri-urban communities Fabiano (1993). This was also unsuccessful, resulting in the establishment of water users' associations in some places, and take-over by the water boards in others. However, access to water facilities increased significantly. For example, the number of kiosks in Blantyre increased[45] from 36 in 1990 to 359 in 2008 following investment from organizations like UNICEF and the Malawi Social Action Fund (MASAF) and international NGOs like Water for People.

Kiosk water supply in the low-income communities is managed in different ways. Water is supplied by the water boards, cities, NGOs and CBOs, and the range of supply systems and their relationships are analysed below.

Water Boards are mandated by law to supply piped water. Given that the supply network lacks the capacity[46] to support the connection of individual households, and that many households in poor urban communities cannot afford to install individual connections, kiosks are provided to afford them piped water at a subsided rate. Lilongwe Water Board had 518 such kiosks at the time of the research for this study, 210 of these having been devolved to water users' associations since 2006, and 216 to communities, leaving only 92 still managed by the Board. Blantyre Water Board had 23 kiosks, most having been transferred to the city assembly or communities.

Community-managed water kiosks are installed at the request of communities keen to access water closer to their homes. Some of the kiosks are those handed over by city authorities to ensure that revenue generated remains in the communities for maintenance or installation of additional kiosks. In Blantyre, 256 kiosks (12 of them vandalized) were managed by communities. The communities elect a water committee to oversee revenue collection, cleanliness, minor maintenance and payment of bills. Lack of transparency leads to failure to pay bills and consequent disconnections if water-committee members fraudulently use revenue meant for bills, or some community members steal the water. This leads to frustration, and forces some households to buy water from other individual households at even higher prices, or indeed to use well or stream water.

[45] Water kiosks and boreholes are a hot political campaign subject in Malawi. In a campaign, several of them may be installed even though they may stop functioning soon afterwards due to poor workmanship or vandalism by supporters of a politician who initiated the development but lost the election. Visitors to Malawi will notice that all street light poles from the airport to Lilongwe old town were cut down for this reason.

[46] For example, Lilongwe Water Board has a total of only about 32,673 connections for all housing, institutional, commercial and industrial uses in a city of nearly 670,000 people. Unaccounted-for water has been increasing from about 16% in 1995 to 34% in 2007. See MIWD (December 2008: 5), Water and Sanitation Sector-Joint Sector Review Report, Lilongwe; Skytta, T (1997) Malawi, Lilongwe Water Supply Engineering Project and Second Lilongwe Water Supply Project-Performance Audit Report No. 16430, World Bank.

City Assemblies install kiosks in low-income communities as a social responsibility to ensure adherence to public health. Either these kiosks are managed by the cities themselves, or they are devolved to communities. Blantyre city had 305 such kiosks. Also in Blantyre, there are 80 kiosks that are privately owned and managed. The private institutions may be Churches, NGOs or associations.

Water Users Associations (WUAs) emerged recently as legally constituted community trusts to give autonomy in kiosk management and to ensure sustained water availability through effective revenue collection and prompt bill payment. The WUAs have since taken over some of the kiosks that were managed by water boards. The emergence of WUAs came from a backdrop of failure by communities to settle water bills (Box 3). According to WaterAid Malawi (2007) this was for several reasons.

- Communities failed to settle their bills because revenues were embezzled, leading to disconnection. In Lilongwe this led to the water board being owed MK24 million (MK3 million from the board's own kiosks and MK21 million from community kiosks. The arrears reached MK31 million by January 2006.
- Management of the kiosks was undemocratic. Politicians such as MPs in Blantyre took over kiosks in Misesa and overcharged communities (MK10 per 20 litres) and used the revenue privately. Meanwhile there was an apparent scramble for kiosks between new ruling party (DPP) functionaries attempting to oust the former ruling party, UDF. By 2007 the kiosk committees in Blantyre had defaulted MK500,000 meant for bills. Some kiosks have been vandalized,[47] due either to malice or to frustration when there are long-dry taps.
- Some kiosks were erected on individual plots, initially for the security of meters, but this led to the plot-owners resisting water committees' responsibility for the kiosks. So either the kiosk had to be relocated, or the plot owners incorporated without election.

While WUAs are showing some success in Lilongwe, in Blantyre the use of committees is still in place except in one area, Kabula Development Association (KDA), which originated the idea of the water users' association. KDA manages 56 kiosks in the Mbayani area. In Mzuzu, there are proposals to "privatize" to individual households who will sell water and pay bills.[48]

Box 3: Problems and interventions in water-kiosk management

Water kiosks are technically straightforward to establish, but they fail without appropriate social and political management. In Lilongwe, each water-kiosk committee had three members responsible for collecting tariffs from householders using the kiosks. Each kiosk was metered and the Lilongwe Water Authority would invoice the community for kiosk water usage based on a meter reading or an estimate of usage. Arbitrary, non-transparent tariff structures and poor collection procedures led to the non-payment of bills. Some kiosks were charging a flat rate of MK100 for unlimited water usage. This rate was too high for the poor in the community and allowed relatively well-off community members to divert unlimited water to their businesses. Some powerful members of the community were illegally connected directly to the municipal supply network, so that responsibility for payment of their bills was passed on to the community. Many householders who had paid kiosk committees for usage found that their payments had not been successfully passed on to the Lilongwe Water Authority. *Cont over*

[47] Blantyre City (2007), "Blantyre City Owned Water Kiosks Reconnection Campaign and Initiation of Interim Committees".
[48] Discussion with Gerald Ngulube, Northern Region Water Board, 13 May 2008.

Faced with huge losses, the Lilongwe Water Authority was unable to invest in maintenance and expansion of the existing supply network, or to support existing kiosk connections. Lacking the capacity to bring management of the kiosks in-house, the Water Authority began to disconnect kiosks. The people most adversely affected by the resulting water shortage were the poor, old and vulnerable; 27 kiosks were threatened with closure. At this point, WaterAid and CCODE intervened and mediated an agreement with the Malawi Water Authority, whereby a more sustainable water-management process would be implemented, leading to effective bill payment and the cancellation of kiosk disconnections. WaterAid consulted extensively with the communities to identify problems with the existing water-management process. A questionnaire was issued and a focus group used to verify its results. Bill payment trends were analysed to identify problem tariff policies.

Based on the findings of this study, WaterAid has proposed building kiosk-management capacity into the Malawi Water Authority. A designated kiosk unit, headed by a kiosk manager, was established to coordinate the tariff using a transparent pricing system, and to liaise directly with communities on water management. After a trial period, the unit would move out of the Lilongwe Water Authority and act as an independent interface between the Authority and the communities it serves. In the long term it is hoped that the kiosk unit will build closer links between the two parties, ensuring a long-term supply of affordable drinking water.

Source: Water Aid/Frank Lawson, “Saving community water kiosks in Malawi”, www.wateraid.org/malawi (accessed 28 July 2008).

Figure 5: Namichimba Stream, Misesa: girls draw water for domestic use first, then wash clothes and clean up. Notice the pipe carrying safe water can only be used to dry clothes

Sources of water

The study found that about 53% of households bought water from kiosks located within their areas, 26.2 % had individual connections, 13.2% bought water from another house plot, 2% had shallow wells on their plots and 4.8 % drew water from other sources such as boreholes and streams (Table 12). These findings are not remarkably different from those of a government study in Blantyre and Lilongwe low-income areas, of 65–70% accessing water through kiosks and 8–20% through individual connections outside or inside houses (Malawi Government, 2007c: 7).

According to the Lilongwe Water Board by-laws, it is an offence to supply water to another person for use in another household, permit another person to collect water from one plot for use at another or indeed to take water from one's own house plot to one's own other plot, except for extinguishing fire or if the beneficiary house has a connection but for some reason lacks water.[49] Similarly, bore holes and shallow wells are not officially permitted in urban areas.

A WHO (2000) report indicates that there is daily water availability in urban areas in Malawi for 24 hours a day. This is surprising considering that kiosks are open for a maximum of about 6 hours a day, as they do not open at night and are scheduled during the day (Malawi Government, 2007c: 7). In Blantyre the Joint Sector Review report noted that only 30% of the service area had 24-hour continuous supply and that 21% received water for less than 6 hours (MIWD, 2008: 5). In addition, the frequency of dry pipes has become so great that the use of unsafe water is not restricted to low-income people. In Blantyre and Lilongwe, there were occasions in 2008 when the whole cities lived without piped water for more than a week. It is therefore surprising that national statistics indicate access to safe water of 99% in Mzuzu, 99% in Lilongwe and 97% in Blantyre (NSO, 2007: 72). According to NSO (2005), in fact 58% of Malawians have to travel more than 15 minutes to reach a water source. In this study, 23% of households reported taking 15 or more minutes to draw water (in a queue), while 63% reported taking 5 minutes or less (Table 13). Almost a quarter of respondents in this study said that they travelled for over 10 minutes to reach the water points.

The practice of scheduling the opening of kiosks, coupled with the frequency of dry taps and distance to water sources, forces people to store water for use during the day or the next. About 98% of households surveyed kept water in their homes for use during the day or next day.

The reasons for scheduling the opening of kiosks for 6–8am (or 6–9am) and 3–6pm (or 2–6pm) in the study areas were given in both focus-group discussions and interviews as being to:

- allow the kiosk attendants time for household chores
- encourage responsible use of water (in Chibavi, Mzuzu the explanation was "some households misuse the water, so we have to maintain discipline")
- keep water bills low and avoid disconnection
- reduce unaccounted-for water, as the person drawing water first cleans pails or washes hands and legs, the cost of which is charged to the kiosk attendant who lacks resources, so ultimately leading to disconnection.

[49] Section 123 of the Lilongwe Water Works Act, published as government notice no. 71 in the Government Gazette of 13 September 1991.

Field observation showed that there were many shallow wells (some only 2m away from the kiosk)[50] in the study areas, and that many households use stream water for washing clothes and bathing (Figure 5). The reasons given for this during focus-group discussion are as follows.

- The kiosks' opening is scheduled. When they open, one may still have water stored from earlier collection or from the previous day. They also open late, at 6.00am, when most households need the water before that time (Angelo Federation).
- There are not enough kiosks; for example, Misesa had only three (benefiting less than 2% of population) located very far apart, and one of these was not working at the time of the study.[51] In this area, boreholes and wells are the dominant source of drinking water. In fact 83% of Misesa residents access water from boreholes, wells and streams. (See also Malawi Government, 2007: 27.)
- When one applies for an individual connection, water boards take too long to connect or charge a very high connection cost. So, one starts using well water and gets used to it.
- Chemicals in piped water cause nausea and do not smell good (Mgona).
- A landlord who is a member of the Seventh Day Church closes the tap on Saturdays (the Church does not allow any work on Saturdays (Mchesi, observation by author).

[50] At Blantyre MHPF village, the kiosk attendant has a well only 3m away from the kiosk where she provides free water, and her toilet is within 5m of a cluster of skyloo toilets diverting urine and bath water into soak pits.

[51] The Joint Sector Review Report notes that at any given times 31% of all water points in Malawi are non-functional (MIWD, 2008: 7).

Table 12: Primary source of drinking water by city and location

City:	Mzuzu			Lilongwe			Blantyre			Total	Percentage
Location/ source	**Chibavi**	**Salisbury**	**Mcheng-autuwa**	**Mgona**	**Mchesi**	**Federation Village 49**	**Misesa**	**Zing-wangwa**	**Angelo Federation**		
No response	0	1	0	0	1	0	1	1	0	**4**	0.3
Buy from water board communal stand pipe	62	24	9	258	190	19	11	3	45	**621**	52.7
Own pipe on plot	94	30	0	4	106	0	3	72	0	**309**	26.2
Buy piped water from another house plot	48	11	1	2	17	0	14	62	0	**155**	13.2
Own well on plot	2	1	0	2	1	0	17	0	0	**23**	2.0
Buy from well on another plot	1	0	0	0	0	0	7	0	0	**8**	0.7
Stream/river	1	0	0	0	0	0	0	0	0	**1**	0.08
Other e.g. borehole	0	0	0	1	1	0	52	3	0	**57**	4.8
Total	208	67	10	267	316	19	105	141	45	**1,178**	100

Table 13: Time in minutes taken to collect water at a facility

City	Mzuzu			Lilongwe			Blantyre			Total	Percentage
Time	Chibavi	Salisbury	Mcheng-autuwa	Mgona	Mchesi	Federation Village 49	Misesa	Zing-wangwa	Angelo Federation		
0	65	19	1	9	64	0	8	44	0	**210**	17.8
1	23	10	1	28	17	2	11	14	7	**113**	9.6
2	27	13	1	38	22	1	17	21	6	**146**	12.4
3	16	2	1	18	23	1	3	8	3	**75**	6.4
4	1	1	0	4	3	0	2	3	3	**17**	1.4
5	28	3	2	50	49	7	14	22	2	**177**	15.0
6	0	0	0	3	4	0	0	0	0	**7**	0.6
7	0	0	0	1	0	0	1	0	0	**2**	0.17
8	4	0	0	1	3	0	0	1	0	**9**	0.76
10	16	6	1	42	42	1	13	14	7	**142**	12.05
12	2	0	0	2	3	0	0	0	0	**7**	0.6
14	1	0	0	0	1	0	1	0	0	**3**	0.25
15	6	4	1	13	17	0	3	3	3	**50**	4.2
18	1	0	0	0	0	0	0	0	0	**1**	0.08
20	6	4	1	20	18	0	10	5	5	**69**	5.9
25	0	0	0	0	1	0	0	0	0	**1**	0.08
30	8	4	0	30	23	3	14	4	7	**93**	7.9
35	0	0	0	0	1	0	0	0	0	**1**	0.08
40	0	0	0	0	3	0	5	1	0	**9**	0.76
45	2	0	0	1	0	0	0	0	0	**3**	0.25
50	0	0	0	0	0	0	0	1	0	**1**	0.08
60	2	1	1	7	19	4	2	0	2	**38**	3.2
90	0	0	0	0	1	0	0	0	0	**1**	0.08
120	0	0	0	0	2	0	1	0	0	**3**	0.25
Total	208	67	10	267	316	19	105	141	45	**1,178**	100

Figure 6: Newly built water kiosk in Area 24, Lilongwe; the cost of the kiosk is reflected in the cost of water

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Cost of water

The study found that the selling price of water varies between providers and that pricing is quite contentious (Annexe 2 shows a 2008 press release on this from Blantyre Water Board). The study found variations in the price of water as follows.

In Blantyre, kiosks sell water at or above MK2.00, and some at MK2.50, MK5.00 or MK10, per 20-litre pail. The recommended price of water per pail according to a Blantyre Water Board press statement of 9 July 2008 (see Annexe 2) is MK0.88. However, during interviews the actual figure was put at MK1.00 while MK0.88 is the buying price for kiosks from the Board. A study by Vazquez undertaken in Blantyre at about the same time also found an average selling price of MMK5.00 per 20-litre pail.[52]

At kiosks run by Lilongwe Water Board the cost price is at MK56/m^3 which is higher than the cost price for community kiosks as the Board aims to recover costs incurred by kiosk construction (Figure 6). The Board-recommended retail price was, until September 2008, MK1.50 per 20-litre pail (MK75/m^3). However, water was sold at MK2.00 per 20-litre pail (MK100/m^3 or $0.71/$m^3$) at the kiosks owned and managed by the Board. The Board ignores

[52] "Millennium Cities initiative: Water and Sanitation Assessment in Blantyre", undertaken between May and July 2008. This study, with final results yet to be released, also found that only 8% used sewers, 9% used septic tanks and about 19% used pit latrines without sharing, making total access to sanitation only 36%. (Information based on discussion with researcher, Victor Vazquez in Lilongwe, July 2008).

this malpractice because communities also have to repay the outstanding bills.[53] Although all arrears had been recovered (in fact kiosks managed by the Board had overpaid by MK12 million from arrears of MK3 million), the price was still at MK2.00.

The raising of the price above the recommended level is meant to cushion kiosk attendants against unaccounted-for water that is billed to them by deduction from their wages. According to Chirwa and Junge (2007: 46), reducing the rising percentage of unaccounted-for water, estimated at 48% in Blantyre and 33.6% in Lilongwe, remains a major challenge. Malawi Government (2007c: 9) put unaccounted-for water at 47–51% for Blantyre and 30% for Lilongwe. If unaccounted-for water was, for example, reduced to 20%, the cost of production of water would decline from MK65/m^3 to about MK41/m^3, leading to the possibility of lowering the tariff to benefit households in low-income areas (Malawi Government, 2007: 9).

Kiosks run by Water Users' Associations in Lilongwe charged MK2.00 per 20-litre pail,[54] and kiosks run by the Catholic Church at Mgona in Lilongwe charged MMK2.50 per 20-litre pail or MK3.00 for a 30-litre pail. In Mgona, water from wells is sold at MK20 per month.

Lilongwe Water Board sells water at MK51/m^3 to community kiosks[55] and the recommend retail price is MK1.50 per 20 litres, but water is sold at MK2.00. A new price of MK58/m^3 was introduced in August 2008 without the knowledge of Water Users' Associations. Surprisingly, kiosks constructed after the period when communities had failed to pay bills and hence did not have arrears (like the CCODE/MHPF kiosk at area 49) also charged MK2.00 per pail. According to WUAs, the Water Board was demanding arrears from January 2008 on the basis of a tariff introduced in August 2008, showing that the Water Board was bent on exploiting the urban poor and hence the need for government intervention.[56]

In Mzuzu, the charge for water from the Water Board kiosks varies between MK150 and MK250 per month. At Salisbury-lines, Kiosk Number 56 was charging MK150 per month, but had an unpaid bill of nearly MK15,000 for the previous month (July 2008). Monthly bills are about MK20,000. Kiosk Number 5 charges MK250 per month and pays MK3,000 monthly with no outstanding bills. The Mchengautuwa Federation Village kiosk in Mzuzu charges MK5 per 20-litre pail, "to avoid disconnection". The community has monthly kiosk bills of about MK5,000 but pays up to MK12,000 per month.

A study by CRS (2007: 11) found that, whereas rural communities face a distance barrier to accessing potable water, urban communities are affected by high prices for water. Therefore, defining access as the availability of a facility is misleading, because other factors operate. For example, because of the high cost of water from kiosks, shallow wells are constructed next to the kiosks. The safer water is physically available, but economically out of reach for the urban poor.

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[53] Interview with Kwezani, Kiosk Manager, Lilongwe Water Board. According to Wellington Mitole, Urban Manager for WaterAid, the justification for the high pricing was not correct because the kiosks are fully funded by WaterAid – in 2007/08, 25 kiosks were constructed by WaterAid on behalf of Lilongwe Water Board. (Statement made at Stakeholders Workshop, 26 September 2008.)

[54] A new recommended official price of MK2.50 per 20-litre pail, up from MK1.50, was approved in September 2008 after complaints from WUAs.

[55] Kiosks vary according to who manages them: some are managed by the water board, others by community voluntary associations.

[56] Sentiments expressed by the chairperson of Lilongwe WUA network at the stakeholders' workshop of 26 September 2006.

During meetings with WUA representatives and focus-group discussions in Mgona, it was noted that while Lilongwe Water Board itself raised the tariff for water, it restricted the WUAs' interest to do the same. In Lilongwe, the tariff was raised to MK51/m^3, but WUAs were requested not to raise their prices "because water is life", causing the WUA to wonder if the Water Board was not aware that "water is life" when they raised the tariff.

Similar conflicts over pricing led to the CCODE/MHPF kiosk at Area 49 being handed back to Lilongwe Water Board in July 2008. Specifically, whereas the community raised only a maximum of MK8,000 per month, the monthly bills were between MK16,000 and MK18,000 because the Board charged the community as if it was an individual household connection, which is charged at MK65/m^3. The Board held that the issue had been resolved in January 2007, maintaining that the community at Area 49 had only failed to manage the kiosk. The unpaid bill for this kiosk as of 9 July 2008 stood at MK71,000, which had to be cleared before its handover.[57] There was evidence of water theft by some households at night, possibly leading to high bills or shortages that were charged to the kiosk attendant.[58]

Household interviews confirmed the varying prices of water in the cities. About 14% of households bought their water at MK3 and there were some who bought it at above MK4 per pail of 20 litres. These figures were confirmed during focus-group discussions, and Blantyre seems to be worst affected by high water prices as in some instances water was sold there at MK10 per 20-litre pail. In Misesa the focus-group discussion found that water was sold there at between MK2.50 and MK5.00.

A comparison with other countries such as Zambia, where kiosk water sells at ZK20 per 20-litre pail,[59] suggests that the kiosk water in Malawi is actually less expensive; but levels of household income also a play a part. The high price of water forces many to use shallow wells or stream water. The findings show that 41% did not indicate the cost of buying water; these households may be those using untreated water sources. At the Federation villages, several households had shallow wells next to a water kiosk and dangerously close to urine soak pits. At the Blantyre Federation village, for instance, there were 25 shallow wells in use (and more under construction at the time of the study); in Mzuzu there were 2 wells and at Area 49 there were 5 wells.

According to Chirwa and Junge (2007), although water price can be very high and vary widely in low-income areas, the poor pay far more than the non-poor and in fact connection subsidies tend to benefit the wealthier residents within low-income areas. This is confirmed by Vazquez (2008) who notes that MK5 per 20 litres is equivalent to MK250/m^3 or US$1.80 which compares poorly with New York City where water costs $0.7/$m^3$. He also notes that a New York worker earning $2,000 monthly spends 0.2% of that wage on water, but in Malawi a person earning MK 23,959 per month spends 19% of this on water. Vazquez notes that high water prices are due to the high cost of reticulation, causing water boards to disregard connecting households individually, and to poor maintenance leading to losses of close to 50% before the water reaches the taps.

[57] Discussion with Kiosk Manager, Edward Kwezani, kiosk management unit, 25 July 2008.
[58] Discussion with Federation Community Kiosk revenue custodian, Murwa, and kiosk attendant Modesta Kaphala.
[59] DTF/GTZ (2005: 3); ZK20 would be about MK7.20 at the exchange rate of ZK0.36=MK1.0.

This point has been noted by government in its study report for National Water Development NWDPII (Investment Planning):

> "the policy to subsidize tariff to kiosks (MK44/m^3) [in Blantyre] with the view that the poor should pay less for water is not achieving the intended results as the poor in the low-income area (kiosk customers) are paying three times (MK150–175/m^3) more than the recommended tariff". (Malawi Government, 2007c:75)

Quantity of water consumed

The Malawi standard for defining basic access to water is apparently 20–27 litres per person per day (as implied by CRS, 2007: 6; MIWD, 2008: 26). The cost of and distance to water has an effect on the amount consumed by communities. For example, water-kiosk attendants said that some families bought one pail per week, presumably only for drinking, while for other purposes they used well or stream water. This observation was confirmed during focus-group discussions. Communities indicated that it was difficult to raise money for all household water needs, so resolved to use less water. In addition, in fear of disconnection, water-kiosk committees schedule the opening of kiosks at specified times.

Each water kiosk is designed to serve 120 households (Vazquez, 2008: 29), but in practice there are far more households than this per kiosk. In Zingwangwa, households had to access the kiosk at Chimwankhunda (about 2km away) or buy water from other houses. At Blantyre Angelo Federation there was one kiosk for over 465 households while at Lilongwe Federation, Area 49, one kiosk served 220 households.

Households far from the kiosk or without enough storage containers are more likely to use well or stream water. It was found for example, at the Blantyre Angelo Federation village that two wells were dug on each side of the only kiosk. SAFAGE (2001 cited by Chirwa and Junge, 2007: 51) notes that 70% of households in Lilongwe that used unsafe or untreated water sources were willing to pay for water from kiosks and individual connections. Therefore, the use of well water next to a kiosk is partly due to the scheduling of opening times. The CRS study also found that 67% of surveyed rural clients walked 20–25 minutes to the nearest water source (equivalent to 1.5–2km), which affects the amount of water used per household (CRS, 2007: 11). In addition, the small number of kiosks resulted in longer waiting times for water collection.

In urban areas, distance may be less significant than time taken to collect water due to long queues or indeed the buying price. As noted above, in this study, 24% of respondents reported travelling for over 10 minutes to reach water points. According to Vazquez (2008), households' lack of storage capacity to buffer the hours of water unavailability results in providers taking advantage of people's desperate predicament by raising the price of water (Vazquez, 2008).

During interviews, kiosk attendants/ water sellers revealed that some families bought only one pail of water at the kiosk in a week, making the water sellers wonder where these families got the rest of their water from. Kiosk attendants also reported that on some days water sales may be as low as MK300, equivalent to only 150 families drawing one pail each.[60] The kiosks serve both people with individual connections and those without. Those with individual connections usually patronize the kiosk when they are disconnected for non-/late payment of their bills. Therefore the importance of kiosks for people in low-income locations cannot be underestimated. Consumption at the kiosk then tends to decline when these households are reconnected, often towards month-ends when they have enough money to make the payments.

[60] Interview with Catherine Vinte, Mgona Catholic Church kiosk attendant.

As shown in Table 14, kiosk water consumption is high when the Board has a disconnection campaign.

Table 14: Water consumption at kiosk 8/11, Mchesi, Lilongwe City

Date	Meter open	Meter close	Consumed litres	Amount (MK)	Receipt no.
23/05/08	4699.3	4727.3	280.0	2100	1640
30/05/08	4727.3	4780.7	53.4	4010	1899
06/06/08	4780.7	4835.7	55.0	4130	8206
13/06/08	4835.7	4900.0	64.3	4835.7	8068
20/06/08	4900.0	4941.6	41.6	3120	8128
27/06/08	4941.6	4970.3	28.7	2160	0387
04/07/08	4970.3	5042.2	71.7	4720	0436
11/07/08	5042.2	5127.7	85.5	7080	1345

Source: Ms Msowoya, Kiosk 8/11

Contrary to the WHO (2000) assertion of 24-hour availability of piped water in Malawi's cities, there are often dry taps. In Blantyre, the Joint Sector Review Report (MIWD, 2008: 5) notes that only 30% of the service area has a 24-hour supply; 18% get water for only 18–24 hours, 31% for 12–18 hours and 21% for less than 6 hours per day. According to Vazquez (2008: 29), some wards have been reported to have had up to 5 days without water: "The poor are the most affected [as they] cannot afford anti-shortage infrastructures such as domestic tanks… in the water kiosks affected by the shortages, long queues are formed waiting for water to come."

According to the Lilongwe Water Board By-Laws of 1991 (Section 97), the Board is not responsible for failure in water supply, which suggests that the Board may not be committed to the provision of safe water, and the same could be argued in the cases of delayed repairs to broken pipes, and stolen water meters. Section 116 of the By-Laws provides that Lilongwe Water Board can decide how much water to supply, and when.

Subsidizing water for the urban poor

Subsidy to water supply in Malawi is in form of a rising block tariff with two objectives. First, the tariff structure attempts to enable low-income earners in low-income areas to pay less than high-income earners. Second, the block tariff system ensures higher charges for higher consumption, regardless of location. The tariff structures for Blantyre and Lilongwe Water Boards are shown in Tables 15a and 15b.

However, Kariuki (2004, cited by Chirwa and Junge, 2007: 51; Malawi Government, 2007) note that households that get water from kiosks tend to spend more on water than those with individual connections. Specifically, it is noted that an average family in a low-income area would draw $7m^3$ per month, paying MK300–MK360, while a family in a high- or middle-income area would use $10m^3$ per month, and pay MK195. It is also noted that the unit price of water charged for a 20-litre pail is much higher than the unit price paid by the non-poor. This was also noted by Skytta (1997), who suggests that middle- and high-income households consuming 100 litres per day spent only 5% of their income on water, while the poor spent up to 10%.

This shows that, according to Chirwa and Junge (2007: 51), the poor pay more than the rich, not only in relative but in absolute terms; and "low income areas subsidize high income earners in low/medium density areas by allowing the water companies to save by not expanding the system." The Malawi Government (2007c: 8) is emphatic in stating that "people in low income

areas are paying 3 times more than the consumers in planned [sic] housing areas including the low density affluent areas". As noted above, the price of water at the kiosks is also nearly double, in the case of Lilongwe Water Board, at MK2.00–2.50 per 20-litre pail (about MK100–125/m^3), the cost price of MK51–56/m^3.

Table 15a: Water tariff structures for Blantyre Water Board

Item No.	Description	Tariffs (MK/m^3)
1	**Water supplied from kiosks**	**44.00**
2	**Water supplied for domestic purposes**	
	First 5m^3 or part thereof	70.00
	Exceeding 5m^3 up to 10m^3	72.00
	Exceeding 10m^3 up to 40m^3	75.00
	Exceeding 40m^3	77.00
3	**Water supplied to institutions**	
	First 10m^3 or part thereof	83.00
	Exceeding 10m^3 up to 40m^3	91.00
	Exceeding 40m^3	99.00
4	**Water supplied for commercial purposes**	
	First 10m^3 or part thereof	83.00
	Exceeding 10m^3 up to 40m^3	91.00
	Exceeding 40m^3	99.00
5	**Water supplied for industrial purposes**	
	First 10m^3 or part thereof	95.00
	Exceeding 10m^3 up to 40m^3	106.00
	Exceeding 40m^3	117.00
6	**Meter rental and new connection charges**	
	Meter rental	300.00
	Meter reading services	63.00
	New connection survey fee	300.00
	New connection fee in all areas	Actual cost
	Meter reconnection fee	1,000.00

Table 15b: Water tariff structures for Lilongwe Water Board

Water tariffs and service charges							
Category	**01.09.99**	**01.07.01**	**01.11.02**	**01.07.03**	**01.01.05**	**01.10.05**	**01.09.06**
	178%	30%	20%	10%	30%	15%	
Residential							
First $10m^3$ (per m^3)	15.01	19.50	23.40	25.74	33	38	42
Next $30m^3$	21.96	28.55	34.30	37.73	49	56	61
Thereafter	30.58	39.75	47.70	52.48	68	78	85
Minimum charge	150.10	195.15	234.20	258.00	335	386	417
Institutional							
Flat rate	26.97	35.10	43.20	47.52	62	71	77
Minimum charge	269.70	350.60	420.70	463.00	602	692	748
Commercial & industry							
First $100m^3$	30.58	39.75	47.70	52.48	68	78	85
Thereafter	38.92	50.60	60.70	66.77	87	100	108
Minimum charge	305.80	397.55	477.10	525.00	683	785	848
Kiosks							
Lilongwe Water Board kiosks	20.02	26.00	30.00	33.00	43	49	53
Community kiosks	17.24	22.40	26.90	29.60	38	44	48
Minimum charge	172.40	224.10	268.90	295.80	385	442	478
Meter testing fees	250.00	250.00	300.00	300.00	390	449	484
Reconnection fees	250.00	350.00	420.00	470.00	611	703	759
Meter deposits							
15mm	250.00	350.00	420.00	460.00	598	688	743
20mm	550.00	770.00	924.00	1,015.00	1,320	1,517	1,639
Contractors	0.00	0.00	0.00	4,000.00	5,200	5,980	6,458
Change of account ownership	200.00	200.00	240.00	250.00	325	374	404

RD cheques penalty fees	200.00	300.00	360.00	400.00	520	598	646
New connection fees							
For connection of 25 metres or less from the Board's service pipe to the consumer's supply service							
For a 15mm connection (standard)	5,276.24	5,276.24	6,330.00	2,000.00	2,000.00		
For a 20mm connection (standard)	8,779.24	8,779.24	10,535.00	10,535.00	10,535.00		
For a 25mm connection (standard)	10,530.64	10,530.64	12,630.00	12,630.00	12,630.00		
For a 50mm connection (standard)	30,260.30	30,260.30	36,000.00	36,000.00	36,000.00		
For connection in excess of 25 metres from the Board's service pipe to the consumer's supply service, a standard charge will be applied for the first 25 metres plus the following charges for every excess metre.							
15mm diameter connection	472.60	472.60	565.00	297.00	297.00		
25mm diameter connection	825.66	825.66	990.00	990.00	990.00		
40mm diameter connection	1,125.90	1,125.90	1,350.00	1,350.00	1,350.00		
50mm diameter connection	1,459.50	1,459.50	1,750.00	1,750.00	1,750.00		
For a connection in excess of 50mm diameter, the charge will be at the actual cost to the Board at the time of installing the connection.							

Source: Malawi Government, 2007c: 64–66.

Measures for coping with restricted access to water

Many poor households store water, partly because kiosks' opening hours are restricted. However, whenever the water board supply fails, or is disconnected, households access water by purchasing water from families with individual stand pipes, using nearby streams, or digging shallow wells of their own or collecting water for free from existing local wells. Digging shallow wells is widespread in Mzuzu, Salisbury-lines where, due to a high water table, any absence of water from the kiosk leads to an immediate digging of a shallow well. Some use shallow wells for other reasons.

At the Mgona focus-group discussion there was mention of a smell of chlorine in tap water, causing nausea. Also in Mgona, some participants said that they travelled to the industrial site at Area 28 to fetch tap water. Mchesi residents travelled to Indian quarters at Area 2 where they were readily assisted with tap water. Misesa families got water from Chiwembe dam. Indeed many families also buy only the water required for drinking, and draw water for other domestic needs from wells or rivers. This arrangement is acknowledged by UNCHS (2006: 120), arguing

that “access to water” may exclude extensive bathing and clothes-washing that can take place at water sources like rivers in cases where households lack piped water.

Knowledge and water-quality treatment
The study found that the water from shallow wells used for “bathing, washing clothes and plates” and, when there are dry taps, also for drinking, was heavily contaminated with faecal coliforms. Some water stored in households was also heavily contaminated because of poor hygiene practices. For example, in Mzuzu, water stored for about two hours in one house was heavily contaminated while water stored overnight at another house was not contaminated. This suggests that knowledge of hygiene is crucial in the safe storage of drinking water. Results for the water quality tests in each city are shown as annexes 1, 2 and 3 at the end of this paper.

The study found that the majority of households (86.7%) were aware of methods to prevent contamination or to treat water for drinking. Many claimed they did treat water (73.6%) through boiling (43.2%) or the addition of chlorine (Water Guard) (30.4%), but at least 7.6% (and perhaps also the 18.2% who were not sure) never treated water to drink. This finding is interesting considering that the majority claim to buy kiosk water that is considered safe. To give the benefit of doubt, it is possible that those who do not treat the water actually do not find it necessary to do so, if it is from the kiosk.

However, the storage of water even overnight exposes it to contamination as family members use a cup/plate/pot to draw water from the storage container. Nearly 82% reported use of cups to collect water from storage containers while 11% claimed to pour out the water. Others reported that they used containers with a tap. At house No. 6 at Mzuzu Federation, water stored for 2 hours was found to be heavily contaminated with faecal coliforms. Since most families do not cover the water, there is an increased possibility of bacterial contamination. A study by WaterAid (2007) at Kiosk 27 at Mgona found that water collected from the kiosk was free of pathogens but got contaminated through: dipping of fingers into the water as pails were lifted onto heads, common dipping of dirty cups into water-storage containers, poor storage, and children being allowed access.

WHO (2000) notes that national drinking water standards exist in Malawi, but are less strict than WHO guidelines. According to discussions with officials, the Water Department uses WHO standards and has often complained about the need to localize standards to reflect the local situation. National drinking water standards that have been developed are still an exact copy of WHO standards. Rural water supplies in Malawi, from boreholes and piped gravity-fed schemes, are not treated, but are still considered potable water although it is expected that potable water must have a zero count of faecal coliforms.[61]

3.6 Sanitation

For the purposes of this study, safe sanitation for low-income areas includes the safe disposal of faeces to avoid the spread of diseases, and facilities adequate for privacy and dignity that are also within easy reach (with no queuing). Improved sanitation therefore should mean the number of sanitary facilities that are better than the most basic safe sanitary measure, rather than in comparison with non-availability.

[61] Discussion with Innocent Manda, Water Chemist, Water Department, 22 August 2008.

Methods of faecal disposal

In Malawi there are different types of faecal-disposal systems. These include flush toilets, pit latrines and several types of ecological sanitation (eco-san toilets, dry or composting toilets). There is also some open defecation in forests, open spaces, on the shore rocks or along roads. Some households use buckets at night, to avoid exposure to crime or wild beasts, and the buckets are emptied into pit latrines in the morning.

Flush toilets, connected to either a sewer line or a septic tank, are mainly used only by high- and middle-income people. Sewer coverage is very low in the country, with small areas of sewers having been developed as one-off projects in the colonial era or with donor funds. Blantyre has 10% coverage and only 9% of Lilongwe's population is served by a sewerage system. The only other areas served are parts of commercial and industrial sites. Mzuzu relies entirely on septic tanks and pit latrines. Septic tanks are often used even where sewer-line reticulation is available, presumably because of the poor record of city authorities on management of sewer lines. In Lilongwe, 19.8% use septic tanks. When full, septic tanks are emptied and the contents transported to disposal ponds.

The ordinary or conventional dug-out pit latrine, with or without a superstructure of either logs or a concrete slab over the pit, is the dominant faecal-disposal measure. A standard pit latrine may be 3m deep and is designed to last up to 10 years. There are various types of structure or screening for privacy, depending on taste and funds. In Lilongwe, 71% of the city's population uses pit latrines. There are some VIP (ventilated improved pit) latrines, which have a concrete slab, permanent superstructure and a pipe to remove odour and keep out flies.

The arborloo and forsa alterna are types of eco-san toilets: shallow forms of pit latrine, 1–1.5m deep, meant to last just one year. After this time, the arborloo pit is filled with ash/lime, soil and leaves and used to plant a tree. The forsa alterna consists of two pits used in alternate years (and the year-old contents are dug out and can be used as manure). Their use is new in Malawi, and doubts exist about their benefits. Proponents of the arborloo, like Simpson-Hebert (2007), emphasize its low cost (at $5 compared to a pit latrine at $12, and VIP at $100); but these comparisons may not be applicable to Malawi where a 50kg bag of cement is about $20.

An improvement of the arborloo is the urine-diverting dry toilet (UDDT) or skyloo which is suitable in high-water table locations or where water supply is poor. Its virtue is that ash or lime that is added hastens dehydration to help kill pathogens; the urine becomes fertilizer (rich in nitrogen, phosphorous and potassium) (Lapid, 2007).

Access to safe sanitation

This study found that the ordinary pit latrine was the dominant method of faecal disposal among the households surveyed, used by at 94%, followed by 4% using toilets with septic tanks (Table 16). Only 1.4% of households in this study lacked any form of toilet. However, Balyeku et al. (2005: 28), in a study on child illnesses in Malawi (Table 17), found that 80% of those studied had no form of sanitary excreta-disposal facility. Among those that had facilities, traditional pit latrines were dominant.

Table 16: Methods of faecal disposal

Disposal method	Frequency	Percentage
No response	3	0.3
Pit latrine	1,109	94.1
Flush toilet with septic tank	48	4.1
Flush toilet connected to sewer	2	0.2
No toilet at all/other means	16	1.4
Total	1178	100.0

Table 17: Disposal of children's faeces in households (2005 report)

Practice	Young children		Older children	
	2000	**2004**	**2000**	**2004**
Throw in toilet/latrine	46.3	74.2	50.3	69.4
Rinse away in water	50.4	13.2	4.9	2.0
Bury in yard	3.3	8.2	5.9	22.2
Throw into rubbish pit	3.7	3.6	1.7	6.4
Throw outside house	4.8	6.7	6.6	1.5

Source: Balyeku et al. (2005: 28)

Of all the nine study areas, only the MHPF villages and Mgona used the eco-san derivatives of the pit latrine – the forsa alterna or skyloo – accounting for 4.4% of households in the study (Table 18). These toilets were constructed by individual households' hired local contractors with loan funds from their organizations. In Mgona the representative organization is the WUA, with technical support from TSP and funding from WaterAid. However, as discussed below, the technology appears not to be used exactly as intended by the designers.

Residents of Misesa complained of indiscriminate defecation by Angelogoveya Federation villagers. This claim was confirmed by focus-group discussion at the Federation village itself, where it was claimed that this was done only during the construction phase. However, a head count at the Angelogoveya Federation Village showed that 69 households (15%) lacked any toilet facility. These households used the adjacent open land or roadsides, or sometimes used their neighbours' toilets. In the same area, 49 households (10.7%) had wells as their water sources, creating a potential danger of pollution.

Table 18: Type of latrine used by households

Type of latrine	Frequency	Percentage
No response	29	2.5
Pit latrine without slab	572	48.6
Composting/dry latrine/eco-san	52	4.4
VIP/simple pit latrine with slab	480	40.7
Flush to septic tank	45	3.8
Total	1,178	100.0

Usage of toilets by households

The study found that only 27.3% of households had exclusive use of one toilet (Table 19). In Blantyre, 31.6% had a toilet for exclusive use; the corresponding figures for Lilongwe and Mzuzu were 14.3% and 43.9%, respectively. A total of 70.4% of households shared toilets with others on the same plot. Even in Federation villages, due to delays in funding, toilets were shared between households. During focus-group discussions at Mzuzu Federation Village it was mentioned that households without toilets "stole" the opportunity to use neighbours' latrines because their own were not ready. These households did not have toilets because their construction requires them to get a loan from the Federation fund. Some people already have loans for small businesses, and do not want to take on more debt at the same time.

Of those who shared toilets with other households, 14.5% shared with two households, 12.6% shared with three households and nearly 3% shared with between 15 and 55 other households. The sharing of toilets may be a major cause of early filling up. While most pit latrines are intended to last for 10 years, experience shows that most stay usable for less than 5 years (Vasquez, 2008), sometimes due to fall-ins especially in sandy soils and water-logged areas. When full, the toilets are supposed to be emptied by special equipment provided by city assemblies, but the equipment is often lacking. Blantyre has only one vehicle on the road and depends on hiring another from Luchenza Township.

Even if the equipment was available, high fees deter clients from low-income communities. For example, the cost of emptying a septic tank in Blantyre is MK10,000 per load, while for pit latrines it is MK3,000 per load. In Mzuzu it costs MK9,000. In Lilongwe, where the service has been privatized, pit-latrine emptying is MK11,000.[62] In the absence of emptying services, and encouraged by large plot sizes, many people simply dig a new latrine when an old one is full. Plot sizes (15m x 25m) in planned low-income areas are so designed as to encourage the digging of successive pit latrines. In the yards of old houses, several pit holes line the backyard, posing continuous danger to children and groundwater. According to city authorities, the major hindrance to emptying pit latrines is the illegal nature of developments and congestion that restricts vehicular access. However, while this may be true of squatter areas, evidence shows that little or no such service is provided in areas that are planned and have access roads.

[62] Author's personal knowledge. This fee must be made as a one-off payment; no instalments are allowed.

Box 4: Manual emptying of pit latrines

In Mgona, one resident has diverted all bathroom water via a pipe to a pit latrine, with the idea that the bath water will act in the same way as the water in a flush toilet and prevent foul smells. When the pit latrine is full, the resident removes all faeces using a 5-litre can into another pit 2.5m deep and next to the pit latrine. In the dry season, all water in this 'soak-away' evaporates. The dry faeces are removed and used as manure in the maize garden. This soak-away is 1m from the house and 17m from two shallow wells, one 6m deep (which he owns) and the other for a neighbour is 2.5m deep. In interview, this resident noted that he frequently suffers from dysentery ("dysentery is actually my disease") but was not aware of the cause. The emptying of pits by hand was also reported by the sanitation core team of MIWD in 2006 (Vazquez, 2008: 47).

Table 19: Usage of toilet facilities by city and township/location

City	**Mzuzu**			**Lilongwe**			**Blantyre**			**Total**	**Per-centage**
Usage	**Chibavi**	**Salisbury**	**Mcheng-autuwa**	**Mgona**	**Mchesi**	**Federation Village 49**	**Misesa**	**Zing-wangwa**	**Angelo Fed-eration**		
Not sure	9	2	2	4	4	0	0	0	0	**21**	1.8
Toilet used by one household only	94	25	6	35	33	18	33	35	43	**322**	27.3
Share toilet with other household/s on plot	102	40	1	228	279	1	72	105	1	**829**	70.4
Share toilet with other households from other plots	3	0	1	0	0	0	0	1	1	**6**	0.5
Total	208	67	10	267	316	19	105	141	45	**1,178**	100

Cost of toilets

Most of the households studied (62%) did not attach cost to their toilets (Table 20). The possible reasons for this are that the toilets were built by themselves, are not considered to have a monetary value, or in fact that some of these households do not have toilets. Among the households not attaching cost to their toilets were 12% from Chibavi in Mzuzu and 16% from Mchesi in Lilongwe. However, for those giving the cost of constructing a toilet, there was a wide range from MK200 to MK80,000. The high figure of MK80,000 possibly referred to construction of a septic tank. The majority of toilets cost below MK10,000.

There was considerable variation in the cost of toilets at Federation villages: MK3,000–17,000 in Blantyre, MK1,600–17,000 in Mzuzu, and MK600–22,000 in Lilongwe. This can only be explained in terms of the type of toilet used and may be proof that some households have not

adopted the eco-san toilets. The skyloo is more expensive than ordinary pit latrines and the cost of materials also varies by city and over time.

UNCHS (2006) reports costs of the toilets in different countries. While a single VIP latrine in India in 2004 cost $49, in South Africa it cost between $52 and $261 in 2002; eco-san toilets without urine diversion in India cost $96 while a urine-diversion toilet in South Africa cost $261–609 in 2002. These costs suggest that eco-san toilets, either with or without urine diversion, are "too expensive for use in small urban centres" (UNCHS, 2006: 58, 62).

The cost of the skyloo toilet in Malawi as used by MHPF costs on average between MK12,000 and MK15,000, or $86–$107. However, the same skyloo developed by Hygiene Village Project may be over MK20,000 ($143) because of the use of fired bricks purchased off-site. Since most households rent the houses they occupy, they rely on landlords to improve the toilets, and any improvement can lead to a rent increase. According to Vazquez (2008), tenants therefore have no incentive to improve sanitation facilities.

Experiences with ecological sanitation

Ecological sanitation (eco-san) is being explored in Malawi in three main forms – arborloo, forsa alterna and urine-diversion dry toilet (UDDT, or skyloo) – as outlined above. The eco-san toilet is well suited in high-water-table areas as it is primarily meant to prevent groundwater pollution. It also has the following additional advantages, being:

- a source of manure from composted faeces for gardening
- a source of fertilizer from collected urine that has been safely stored in containers over a specified period; the urine can then be diluted and sprinkled on the garden
- less foul smelling than an ordinary pit latrine
- a source of income, as faeces and urine can be sold, and this is recommended if the owner does not have a garden
- suitable for congested areas as it requires little space (as there is no filling up, or falling in leading to the need for new structures).

A few organizations are promoting eco-san toilets. These include WaterAid and Water for People that support local NGOs like CCODE/MHPF, Hygiene Village Project and TSP. CCODE/MHPF in particular have adopted the technology on a large scale in Malawi. In the MHPF villages the use of eco-san toilets was adopted in 2003. The initial choice of the forsa alterna seems not to have worked well. Some pits were built without waterproof roofs and so got flooded in rainy seasons. Some of them, especially at Area 49, were near the stream and got flooded with both ground- and storm-water. Some households also had shallow wells near these forsa alterna toilets, making the toilet no different from, if not worse than, the ordinary pit latrine as a source of pollution. MHPF then changed to urine-diverting dry toilets (UDDTs, or skyloos) with the aim of avoiding or reducing problems of contamination and foul smells.

The adoption of UDDTs however has yet to solve all these problems, as the urine, rather than being collected, is diverted into drains or small soak pits at the back of the superstructure thereby producing a foul smell for neighbours, and possibly endangering groundwater. Some households in the three Federation villages studied also have shallow wells where they collect water for drinking, washing, bathing, and cleaning plates (Figure 7). The most heavily used well at Angelo Federation in Blantyre is located midway (5m) between two urine-diversion soak pits. Water-quality tests showed that all these wells are not seriously contaminated with faecal coliforms (see Annexe 1), mainly because the settlements are new.

Observations showed that some of the UDDTs did not have roofs and in the rainy seasons would get flooded, thereby affecting the drying and composting process of faeces. Further, many households do not add ash and soil as recommended: either they use too much soil, leading to early filling up, or the soil it too sandy, leading to possible poor composting.[63]

It should also be noted that the adoption of eco-san toilets in Malawi has been slow and very limited to date, except in Federation villages where adoption is tied to acceptance of Federation membership.[64] In Mgona the WaterAid/TSP-supported eco-san toilet promotion is still in its infancy, largely because adoption is a matter of conviction – and many, including government officials, seem sensitive on the issue of handling faecal matter. In Mgona, fewer than 10 households have adopted the forsa alterna, about 6 have adopted the arborloo, while the skyloo is totally shunned on account of its cost and lack of understating of operation of the new technology.[65] Even in the Federation villages, some households used ordinary pit latrines "disguised" with a skyloo superstructure. For instance, at Angelogoveya Federation Village, there are 55 pit latrines, some with skyloo superstructures. The reason for the "cheating" relates to the cost of the stigma of touching faecal matter. At Area 49 some households still have the forsa alterna, despite its technological inferiority.

Figure 7: Mzuzu Federation Village: collecting water from a shallow well 1.5m lower than a urine-diversion pipe 4m away

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[63] Interview with Jairosi Sadi, Blantyre Federation, 17 July 2008.
[64] Plots in traditional housing areas are larger than expected in other countries because of provision for pit latrines and waste pits. CCODE was permitted to use smaller plots by the planning and city authorities on the understanding that eco-san toilets do not require as much space. Federation members therefore have to adhere to use of eco-san toilets (see Manda, 2007).
[65] Interview with Chairman of Mgona WUA, Mr Phiri, and member and block leader, Mr Mwala, 14 July 2008. Also confirmed by interview with Bernard Mphepo, TSP Water and Sanitation Officer, 14 July 2008.

In the four communities using eco-san toilets (three Federation villages and Mgona), the failure to manage the full cycle of the technology of toilets as per design offsets the anticipated advantages such as fertilizer from urine if collected. In addition, the passing of urine through a pipe onto storm drains and soak pits, or abandoned forsa alterna toilets, contributes to the foul smell that may intensify over time. Uncovered soak pits can also encourage mosquito breeding.

Whereas the skyloo is intended primarily to prevent groundwater pollution, it has been taken as a source of faecal manure (a secondary purpose), with potential hazard to community health. Though presently pollution from urine is absent, as noted from low nitrates, this is only so because the settlements are new and there is an element of dissolution because of the locality in high-water-table areas. The case of Mgona, an older squatter settlement, where the water table is low, testifies to the potential of urine pollution through nitrates (see Annexe 1).

The question of ash usage in eco-san toilets implies adequate availability of charcoal or firewood, which could contribute to deforestation, or the ability to procure lime which is a further cost. The lime-making factory owned by the Federation that would supply lime cost-effectively has not been operational for two years. However, during focus-group discussions, householders said that as soon as they start training for and constructing these toilets, storage of ash also starts, and they have had no problems related to adequacy or availability when the toilets become ready for use.

Figure 8: The first skyloo manure harvest at Blantyre Federation Village

According to Rathnabharathie and Kariyawasam (2007), despite their low cost and suitability in congested housing areas, eco-san toilets need to be free from construction errors and households using them require familiarity with both hygiene practices and operation of the system itself. These aspects appear inadequate in the case of low-income urban communities' adoption of the technology in Malawi.

Figure 9a: Urine-diversion pipes leading into soak pits

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Figure 9b: New skyloo toilets at Area 49, Lilongwe: note the concrete soak pit and distant pipe into a storm drain

© Mtafu Manda, 2008

Figure 9c: New skyloo to divert urine and bath water into abandoned forsa alterna, Area 49, Lilongwe

© Mtafu Manda, 2008

However, with the first harvest of skyloo manure in Blantyre (Figure 8) going at a test price of MK1,000 per 50kg bag, sold to Blantyre City Parks Department, there is a greater potential for adoption as value is attached. Likewise, because other organizations are also adopting it, there is potential for the skyloo technology to be scaled up. One fertilizer manufacturer, Optichem Ltd, has tested skyloo faecal manure,[66] and found it to have high nutrient content: that company has ordered 20 tonnes.

The collection of urine for sale is currently affected by lack of a market. However, most skyloos observed, such as the skyloo adopted by Hygiene Village Project in Ndirande do not have a urine collection facility; instead urine is diverted into a soak pit – even at the demonstration site (Figures 9 and 10). During focus-group discussions at the Federation villages, some of the reasons given for not collecting urine were that:

- families do not have gardens in which to use the fertilizer
- there is no market for the fertilizer presently
- households may not have enough storage containers (as several will fill up before maturity)
- children could play with the urine and get diseases
- "AIDS" could be transmitted through the urine
- the containers cost money.

Figure 10: Demonstration skyloo at Ndirande by Hygiene Village Project

®Mtafu Manda, 2008

[66] This information was provided by Mr Jairosi of Blantyre MHPF.

Table 20: Sources of finance for toilet construction

City	Mzuzu			Lilongwe			Blantyre			Total	Percentage
Source	**Chibavi**	**Salis-bury**	**Mcheng-autuwa**	**Mgona**	**Mchesi**	**Federation Village 49**	**Misesa**	**Zing-wangwa**	**Angelo Federation**		
No response	128	36	0	147	163	1	55	94	6	630	53.48
Own labour	18	6	0	33	17	6	7	11	2	100	8.49
Own funds to pay workers	62	25	3	87	135	10	43	36	15	416	35.31
Loan	0	0	7	0	0	2	0	0	22	31	2.63
Total	208	67	10	267	315	19	105	141	45	1,177	100.0

3.7 Solid waste disposal

Several methods of waste disposal were noted during the study. In general it was noted that urban poor communities are not well served by city authorities as collection of solid waste is erratic or not provided. Where it is provided, this is by simply leaving a skip in the communal area for households to deposit their waste. City authorities may come to collect the skip for disposal at landfill sites. The collection of skips for disposal is affected by administrative factors such as inadequate number of vehicles. In Blantyre there are only 15 lorries for this service. Inaccessibility for vehicles due to congestion of houses posses another problem.

The study found that many households (42.3%), in the study areas dispose of waste in waste pits dug within their plots, while 11.9% throw waste on the road-side, 9.1% throw waste on the river-side and 9.1% use community/city skip sites (Table 21). These findings are not significantly different from those of the Integrated Household Survey of 2005 that found that 49% of the households in Malawi used rubbish/waste pits, while in urban areas 45% of the households used rubbish pits. The integrated household survey also found that in urban areas, 25% dump waste on public open spaces (NSO, 2005a: 95). The low level of utilization of city skip sites reflects the small number of skips placed very far apart. The garbage in these skips overflows because the skips remain uncollected for long periods due to vehicle shortage or neglect. Local residents may burn the waste in the skip to avoid overflows being blown to nearby homes. During focus-group discussions, it emerged that collection of waste in the study areas is restricted to markets, where, as confirmed by huge pile-ups of waste, it is also erratic.

According to Mulula, waste management problems stem from weak institutional capacity in terms of insufficient technical expertise, financial resources and equipment, and are compounded by lack of awareness on waste separation. For example, Lilongwe City fails to manage only about 109 metric tonnes of solid waste generated.[67] In Blantyre up to 70% of the 540 tonnes of solid waste is not collected because of lack of vehicles and inaccessibility of the congested low-income areas (Vazquez, 2008: 46). This is confirmed by about 72% of respondents claiming never to see city waste-collection vehicles in their areas, as contrasted with 28% who see the vehicles. The waste-collection vehicles are mostly seen in Mchesi, the home of 84% of those who see these vehicles, accounting for 20.7% of the total sample. Although problems of access in these areas may lead to failure to empty pit latrines and septic tanks from individual households, the failure to collect solid waste may also be for other reasons because even areas that are accessible, such as markets, are not adequately served. In fact some of the wastes from markets are heaped along major roads. Neglect may also be a major factor.

At household level, most families, because of lack of knowledge on the use waste as manure or on separation as noted above, have the option either to bury filled pits and dig a new one (31%), or burn the waste (6.2%) when pits are full. Very few (4.1 %) would use the waste as manure on their gardens. A block leader in Mgona, to emphasize the shortage of land in his area, told enumerators that he had asked his neighbours to dispose of all their solid wastes at his premises to bury a large drain so that his land increases in size. Those surveyed who did not respond to this question (25.4%) may include those disposing of waste on road- or river-sides, open areas and skip sites.

[67] Of which 15% is from industry, 25% from commercial areas, 40% from residential areas and 15–20% from hospitals (interview with Mr Mulala).

Table 21: Methods of solid waste disposal

City	Mzuzu			Lilongwe			Blantyre			Total	Percentage
Method	**Chibavi**	**Salis-bury**	**Mcheng-autuwa**	**Mgona**	**Mchesi**	**Federation Village 49**	**Misesa**	**Zing-wangwa**	**Angelo Federation**		
No response	26	19	1	93	96	2	18	38	6	**299**	25.4
Waste pit on plot	165	40	8	57	101	8	63	32	24	**498**	42.3
Throw waste on road-side	6	8	1	47	27	5	17	15	14	**140**	11.9
Throw waste on river-side	7	0	0	63	7	2	4	23	1	**107**	9.1
Use communal waste/city-tip site	0	0	0	6	73	0	0	28	0	**107**	9.1
Open area within location at night	4	0	0	1	12	2	3	5	0	**27**	2.3
Total	208	67	10	267	316	19	105	141	45	**1,178**	100.0

3.8 Personal hygiene practices

Washing hands
According to a nationwide 'Soap Campaign' launched in July 2008 by UNICEF and the Ministry of Health, hand-washing is essential to prevent cholera and diarrhoea at four critical times – after using the latrine, before preparing food, before eating or feeding children, and after changing babies' nappies. The questionnaire survey asked respondents to state the critical times to wash hands, and obtained the following response (Table 22):

- before eating, 84%
- after eating, 3.1%
- after using the toilet, 10.7%
- after cleaning babies nappies, 0.7%
- not sure, 1.4%.

The high percentage of awareness on washing hands before eating is not surprising. Issues of hygiene are taught from early years in primary schools, covering how water can be contaminated, how diseases spread through drinking contaminated water, and how to keep drinking water safe. Washing hands with soap, however, is not emphasized.[68] When asked "*what do you usually wash using soap*?" the majority of respondents said that they use soap for washing clothes, washing plates and pots, for bathing, and for washing hands after changing babies and after using the toilet. Only 1.8% of the respondents said that they usually used soap to wash hands before eating. This finding is almost the same as the 2% at national level recently reported by government.[69]

As mentioned above in relation to water treatment, 86.7% of respondents knew some method of treating water to make it safe to drink, but 7.6% did not treat their water in any way and nearly 82% drew water with cups/pots from storage containers. According to the WaterAid (2007) study in Mgona, this practice was a major cause of water contamination.

A gap between knowledge and practice was noted by Training Support for Partners (TSP) working in Mgona. According to TSP, knowledge on hygiene was rated as between 25% and 30%, but practice was very poor as some households were found not to have any toilet and in some cases 14 households shared one toilet where hygiene was significantly compromised.[70] A similar gap between knowledge and practice on hygiene was also observed by Catholic Relief Services (CRS) in their study which found that 82% of people knew the importance of hand-washing but that 56% did not have hand-washing facilities to prevent contact with faecal matter after defecation (CRS, 2007: 11).

Apart from issues of knowledge and practice on hygiene, Balyeku et al. (2005: 28) observed that the promotion of hand-washing with soap required studies to determine how much extra water would be needed for this, and the impact on family resources. According to one government minister, 73% of households in Malawi have soap available, but do not necessarily have the "mental attitude" to use it as necessary for good hygiene.[71]

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[68] Malawi Institute of Education, *General Studies Book 3*, chapter 11.
[69] Andrina Mchiela, Principal Secretary for the Ministry of Irrigation and Water Development, quoted by *Sunday Times* Newspaper, 9 November 2008, at the opening of a workshop at Liwonde for District Water Officers on Sustainable Community Management of Rural Water Supply, Sanitation and Hygiene. Mchiela cited the Multi-Indicator Cluster Study (NSO, 2007).
[70] Discussion with Bernard Mphepo, Water and Sanitation Project Officer, 14 July 2008.
[71] Adrina Mchiela, Principal Secretary, quoted by *Sunday Times* newspaper, 9 November 2008.

Table 22: Critical times for washing hands

	City			Total	Percentage
	Mzuzu	**Lilongwe**	**Blantyre**		
No response	6	10	1	**17**	1.4
Before eating	229	508	253	**990**	84.0
After eating	3	18	16	**37**	3.1
After using the toilet	43	62	21	**126**	10.7
After cleaning babies	4	4	0	**8**	0.7
Total	285	602	291	**1,178**	100

Disease incidence

Diseases related to poor water supply and sanitation include malaria, cholera, dysentery and other diarrhoeal diseases. While there are very limited data on these diseases in Malawi, malaria is very widespread, accounting for 40% of hospital visits and 18% of all hospital deaths, with 4 million cases and 7,000 deaths being recorded in 2007 alone.[72] The Integrated Household Survey reported that malaria accounted for 39% of reported cases of illness (47.4% in urban areas) two weeks prior to the study; 16% reported diarrhoea nationwide (urban diarrhoea was reported at 14%) (NSO, 2005a:33). In Blantyre and Lilongwe, cholera is almost annual in low-income areas. In 2005/06, 1,497 cases were reported in Blantyre City even though mortality was controlled to below 4% (Vazquez, 2008: 53). In the 2008 /2009 rainy season, Lilongwe city reported the highest number of cholera cases: 1,478 (out 2,498 countrywide), with 44 deaths all in low-income areas of Chilinde (Area 21), Phwetekere (Area 36) and Area 24 largely due to poor access to safe water and sanitation.[73] A breakdown of cases in February 2009 showed that clinics run by the Lilongwe City Assembly reported cholera cases as follows: Area 25 (next to Mgona) 105 cases, Area 18 (not far from Mgona) 137 cases, Phwetekere (Area 36) 318 cases, Chilinde (Area 21) 591 cases. Chilinde had the highest number of cases because it was also the isolation centre.[74]

During discussions with communities in the nine study areas, participants mentioned that such diseases have occurred in their areas. In Mgona, Lilongwe it was reported that the adoption of eco-san toilets and the installation of water kiosks by the Catholic Church was a result of a past cholera outbreak. Mgona participants said that before 2006 cholera outbreaks were almost annual. They recalled that in 1993 there were at least 10 deaths every day for nearly three weeks in the area, but this problem has stopped since the provision of piped water and boreholes.

[72] Khumbo Kachali, Health Minister, quoted in *Daily Times* newspaper, 31 July 2008, at the launch of the distribution of 1.1 million insecticide-treated mosquito nets.
[73] Kondwani Munthali, 'Cholera Hits 17 Districts,' *Nation Newspaper*, 11 February 2009.
[74] Discussion with Catherine Kunje, Acting Principal Nursing Officer, Lilongwe City Health Department, 18 February 2009.

In Misesa, Blantyre, cholera-related deaths were also mentioned. Most of the cholera outbreaks are in the rainy season because the unsafe water sources are easily polluted by poor sanitation measures. For example, Palamuleni (2002) found that in South Lunzu bacterial pollution was at a maximum in the rainy season due to seepage from inclined pit latrines. During the rainy season, most pit latrines fall in, making households opt for open defecation, and ripe mango fruits are eaten often without hand-washing (Vazquez, 2008). The poor sanitary facilities in the low-income urban areas, coupled with poor hygiene, pose serious health threats to the households and their immediate neighbours. Steven Esray as cited by the thematic group on water and sanitation in the Malawi PRSP process,[75] suggests that improvements in water and sanitation can reduce diarrhoeal disease dramatically but that the two most effective measures relate to sanitation and hygiene (Table 23).

Table 23: Reduction of the incidence of diarrhoea by water and sanitation project

Type of intervention	Percentage reduction
Water quantity improved	20
Water quality and quantity improved	17
Water quality improved	15
Sanitation improved	36
Hygiene behaviour improved	33

4. Summary findings and conclusion

This study was undertaken primarily to draw attention to the situation of water and sanitation in low-income housing areas of urban centres, with a view to assisting policy makers and actors planning interventions to help Malawi contribute to the realization of the Millennium Development Goals on water and sanitation and environmental sustainability. The findings of the study conducted in nine low-income settlements within Blantyre, Lilongwe and Mzuzu indicate considerable deprivation and suggest that there is a link between household income, quantity and quality of water consumed, and sanitation methods.

The situation is not so bad in the newly developed housing communities initiated by the Malawi Homeless People's Federation (MHPF), largely because the problem of congestion cited by city authorities for poor service delivery has been addressed. The older, planned traditional housing areas have developed into slums because the supply of serviced plots at city level is inadequate. Government acknowledges that slum populations increased considerably between 1990 and 2005, from 1.3 million to 1.9 million.[76] The Federation villages face the same threat. In squatter areas in all three cities, the congested settlements and overcrowding create a recipe for disease outbreak: the wells and pit latrines of neighbours are often separated only by grass fences. The situation of water and sanitation in terms of access and quality remains poor and does not vary much between the nine areas.

The new Water Users' Associations (WUAs) have helped water boards to recover long-standing defaulted bills, and show potential for good governance in water supply. Key informant

[75] A review of the poverty reduction strategy programme (PRSP) process in relation to the water and sanitation sector and comments on the resulting priorities produced by the thematic group, August 2001.
[76] See Malawi Government (2007a: 33). Of course these data are suspect because the urban population for the whole of Malawi in 1998 was only 1,435,436. See NSO (2002: 2).

interviews also indicated that, as a result of WUAs, kiosk meter-reading is jointly undertaken by water board and WUA staff. The WUA then calculates the fees due even before water board issues an invoice, thereby reducing the workload of the water utilities. However, observations and focus-group discussions suggest that water boards are not accountable to their clients, nor are they responsible for interrupted and poor-quality supply. The Boards have raised prices without consultation, leaving WUA committee members in great difficulties. Their lack of power to influence policy direction can be a major barrier to realizing the objectives for which WUAs were established.

According to Satterthwaite, McGranahan and Mitlin (2005: 22), in order to meet water and sanitation MDGS, an attitude shift is essential – away from patronage-based relationships between the urban poor and local governments and water utilities, and towards relationships that are equal, transparent and accountable. The kiosk water-supply system in which the community is involved in implementation was found to be an appropriate and effective way to improve delivery for the urban poor in Zambia in 2004. However, it would appear that this success in Zambia was largely because of a devolution trust fund set up to support commercial utilities (similar to WUAs in Malawi), to extend their services through a national network of such organizations (see DTF/GTZ, 2005).

Regarding sanitation, the experience of MHPF shows that there is potential for up-scaling the use of ecological sanitation nationally, but this is threatened by the poor and partial adoption of the technology. Considering that Federation plot sizes were reduced on the understanding that the eco-san toilets are safe, a potential danger exists in up-scaling because improper use can result in these toilets being more hazardous than conventional pit latrines. Further, noting the small plot sizes and that already some houses are being extended by their owners, congestion is likely in the near future. It is acknowledged however that the primary purpose of Federation villages was adequate housing with secure tenure.

3.9 Summary findings

There are variations in the definition of adequate access or safe access to water and sanitation that are cause for exaggerated and conflicting assessments. It appears that *coverage* is seen as synonymous with *accessibility*, resulting in false hopes of meeting the MDGs.

Sanitation is under-emphasized in relation to water supply, despite the recognition of the inseparable link between them. Water supply is approached as an investment, while inadequate sanitation is regarded as an issue requiring increased education on hygiene behaviour. For example, a sanitation marketing strategy has been developed to promote on-site sanitation, while for water supply an investment planning document[77] was prepared

Although the various players are contributing significantly to ensure sustainable adequate access to water and sanitation, they are affected by inadequate coordination at policy and operational level. Specifically, the authority for water is the Ministry of Irrigation and Water Development (MIWD), while sanitation has an unclear position within multiple jurisdictions of local governments, water boards and the Ministry of Health. The result of this is that each of these authorities avoids making critical decisions to address the issues of poor sanitation. An attempt has been made to set up a department for sanitation services to resolve this, but the National Sanitation Policy approved recently has yet to be implemented.

[77] See Chimulambe et al. (2007); Malawi Government (2007c).

Access to adequate and safe water and sanitation in low-income urban areas is affected by a variety of factors, including facility availability, cost, distance to the facility and waiting time. Therefore the commonly used indicator of distance to the facility may not be applicable in most of these areas. There are several reasons for poor access by households to safe water. Poor household water-management practices may contribute here, but evidence from the study of nine settlements clearly demonstrates that the water boards' failure to supply water continuously, the high cost of water and the scheduling of kiosks are the most significant factors leading low- income households to resort to the use of unsafe sources or to storage of water.

Those people without adequate storage facilities, even if they want to use safe water when the kiosk is closed, have no option but to use streams or shallow wells located next to the kiosks. The high costs of water paid by low-income communities is not due only to the monetary prices – although these are higher than those paid by better-off consumers – but also to the fact that they have to travel to access the water at a kiosk, and then have to wait or go at night. Despite this, low-income communities are required to pay old bills, current bills and often for the costs of the kiosks as well. With water priced at MK2.50 per 20-litre pail, a family of five using 40 litres each per day would spend MK750 per month.

Within low-income areas, communities are aware of the need for safe water and sanitation, yet poor hygiene practices are prevalent. It may be that some public health campaigns are misdirected, as it seems that "hand-washing" is confused with "hand-washing with soap". However, the latter may have implications related to income levels, and indeed to how early the importance of soap was introduced in the community.

Based on the experience of MHPF villages and at Mgona with eco-san toilets, despite the failure by some households to adopt the technology, there is potential for up-scaling the initiative to the national level. However, the current partial adoption of the technology can seriously compromise public health and could affect sustainability and/or risk the support of authorities in Malawi. It is apparent that adoption by low-income communities is affected by inadequate understanding, if not hurried implementation. Specifically, while the eco-san toilets adopted by MHPF and other community-based organizations can make a lasting contribution to the housing sector through enabling increased numbers of families to access small plots, the poor adoption of the technology has the potential to pollute underground water, contrary to the intention of the innovation.

The introduction of Water Users' Associations (WUA) is a major outcome of the conflict between water boards and communities arising from disconnections, and represents progress towards management systems that ensure sustainable water supply and prompt payment of bills. However, it is apparent that the water boards are unaccountable to WUAs, who are intended to be the ultimate suppliers to and representatives of low-income water consumers. WUAs are therefore not only major customers of the water boards, but also major stakeholders in the water and sanitation sector. It is also apparent that water boards are more concerned with revenue than with service delivery, as shown by the frequency of dry pipes and bursting mains.

There is evidence of neglect in service provision to low-income areas on the pretext of poor vehicle accessibility and the desire to prevent further growth of informal settlements. This is counter to the aspirations of MDGs, and likely to mitigate against improving conditions for the urban poor.

In conclusion, the situation of water and sanitation in low-income housing communities in urban Malawi is poor due to a variety of factors. Wrongly defined indicators give a false impression that the country is on track to meet the MDGs. Currently funding is inadequate and investment plans exclude issues of sanitation. Without immediate action, and through the interplay of the effects of the shortcomings outlined, Malawi may be, despite impressive official statistics, very far from meeting the MDGs related to water and sanitation. In any case, Malawi would benefit greatly by reducing the use of unsafe water and sanitation as this would have considerable impact on levels of deprivation and disease, which is surely the main point – both of the MDGs and of good governance itself.

4 Recommendations

In order to make meaningful progress in the water and sanitation sector in urban Malawi, the following recommendations may be useful.

1 There is a need for national consensus on the definition of adequate and safe access to water and sanitation, so that all actors focus on the same agreed targets and indicators.

2 Public awareness on water and sanitation linkages in low-income areas should be emphasized and incorporated in all development initiatives for maximum public health benefits. The introduction of water and sanitation in schools requires follow-up on aspects of practice, perhaps through practical exercises rather than information alone.

3 The pricing of water for the low-income communities requires greater transparency, for consumers to appreciate the operational costs and challenges faced by water utilities. This could increase access to safe water and also prevent meter vandalization resulting from frustration.

4 The concept of the Water Users' Association (WUA) is perhaps currently the best option for sustainable water management and supply, and its initial success in Lilongwe suggests that collaboration provides a mechanism for sustainability. However, this requires further debate and insight to ensure consumer satisfaction and transparency on utilization of revenues. WUAs should not be a means for water boards to evade management problems or generate more profits at the expense of consumers. WUAs should be a governance structure in which the urban low-income communities play a role appreciated by the water boards and government. A national network of WUAs should be considered, also to form a conduit for national and external funding.

5 National water and sanitation development should balance investment in both water and sanitation, for the full realization of public health benefits.

6 The implementation of the National Sanitation Policy, and therefore establishment of the sanitation services department, should be speeded up to harmonize issues of sanitation management.

7 The adoption of sanitation technologies, including ecological sanitation, among low-income communities requires appropriate application and support. Otherwise the intended outcomes

may not be realized, or could indeed be reversed by severe threats to public health. Other options such as community sewers[78] could be explored.

8 There is an urgent need for upgrading of the low-income areas, alongside new housing, to relocate residents from congested localities such as Mgona and Mchesi in Lilongwe, Salisbury-lines in Mzuzu and Zingwangwa in Blantyre, where living standards have reached a point that threatens the general public health.

9 Further research is needed on the design of appropriate awareness messages promoting the adoption of improved water and sanitation technologies. Far more could be done to support low-income people faced with the challenges of balancing the demands of urban survival in combination with little knowledge on the practice of good hygiene for safe and healthy living.

[78] One similar approach is the Orangi Pilot Project in Pakistan, as outlined in "NGO Profile – Orangi Pilot Project*", Environment and Urbanization* Vol. 7, No. 2, pages 227–236.

ANNEXES

Annexe 1: Analysis of water quality at the study sites

Mzuzu water quality results[79]

Sample site	Sample type	Vol-ume	Water quality results										
			Chlorine residue (mg/l)	Faecal coliforms (/100ml)	Appearance	NTU (turbidity)	pH	Chloride	Alkaline	Carbon-ate	Bicarb-onate	Total hardness	Calcium hardness
Federation CWP	Treated distribution	100	0.7	0	clear	1.3	7.1	7.0	16	0	19.52	26	44
Federation House no. 6, water stored from 9am (test at 11am)	Treated distribution	100	Trace	TNTC									
Federation well	Raw	100	-	TNTC									
Chibavi CWP	Treated distribution	100	0.5	0	Clear	1.5	7.0	7.0	14	0	17.08	20	44
Chibavi, water stored overnight (test at 12.00 noon)			Trace	0									
Chibavi well	-	-	-	-									
Salisbury-lines, CWP	Treated distribution	100	0.5	0	Clear	1.4	6.9	11.0	18	0	21.96	20	38
Salisbury-lines, stored water from 9am (test at 1pm)	Treated	100	Trace	0									
Salisbury-lines, well	Raw	100	-	TNTC									

[79] Analysis by Comparator using DPD method. Comparator is calibrated from 0.1 to1.0 mg/l; any measure below 0.1mg/l cannot be recorded. TNTC means colonies of faecal bacteria Too Numerous Too Count. Analysis for Mzuzu by Chatonda V. Madise, NRWB.

Lilongwe water quality results[80]

Sample site	Sample type	Volume	Water quality results											
			Bacteriological parameters		Chemical parameters									
			Faecal coli-forms (/100ml)	Faecal strepto-coccus (/100ml)	Appear-ance	NTU (turbidity)	pH	Chloride	Alkaline	Carbon-ate	Bicarb-onate	Total hard-ness	Calcium hard-ness	Nitrates
Federation kiosk	Treated Distribution	100	1	1	Clear		-	-						
Federation, Murwa's House no. 6, water stored from 9am (test at 11am)	Treated distribution	100	2,134	434	Clear		-	-	-	-	-	-	-	
Federation well at Kathunba's House	Raw	100	564	17	Clear	2.0	7.17	20.3	200	0	244	224	66	0.14
Mgona kiosk No. 1	Treated distribution	100	19	0	Clear		-	-	-					
Mgona, Mrs Chaswa Banda, water stored overnight (test at 12noon)	Treated	100	186	10	Clear		-	-	-					
Mgona, borehole next to WUA office	Raw	100	24	25	Clear	1.0	6.87	13.5	15.9	0	195.3	218	65	3.03
Mgona Musomera's house, well	Raw	100	12,050	1,900	Cloudy	2.0	6.82	220	446	0	544	719	248	70.4
							-							

[80] Chlorine residue analysis by Comparator using DPD method. Comparator is calibrated from 0.1 to1.0 mg/l; any measure below 0.1mg/l cannot be recorded. TNTC means there are colonies of faecal bacteria Too Numerous Too Count. Analysis for Lilongwe by Mr Deziderio Kaikho Sitima, Assistant Water Chemist, Central Water Laboratory.

Mchesi kiosk	Treated distribution	100	2	1	Clear				-					-
Mchesi, Majuta's house; stored water overnight (test at 1pm)	Treated	100	264	138	Clear				-					-
Mchesi Musosa's house, shallow well	Raw	100	112,800	1,600	Clear	2.0	6.67	67.6	173	0	212.3	239	70.2	2.27
Malawi Drinking Water Standard		100	0–50	0–50	Clear	0–25	6.0–9.5	0–750	0–800	-	-	0–800	0–250	0–100
WHO Guidelines for Drinking Water Quality		100						-	-					45

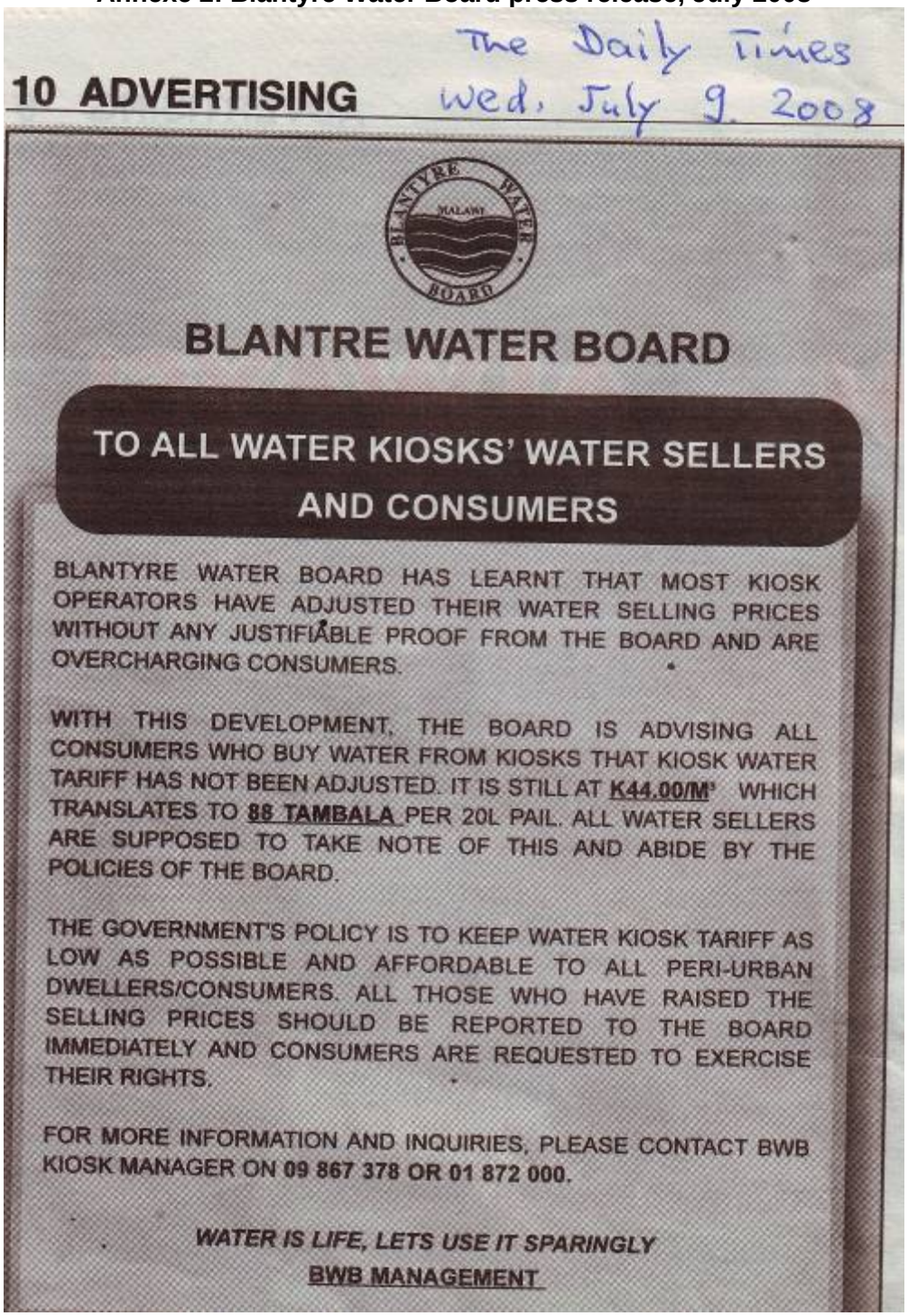
Blantyre water quality results[81]

Sample site	Sample type	Volume	Water quality results											
			Bacteriological parameters		Chemical parameters									
			Faecal coli-forms (/100ml)	Faecal strepto-coccus (/100ml)	Appear ance	NTU (turbidity)	pH	Chloride	Alkaline	Carbon-ate	Bicarbo nate	Total hard-ness	Calcium hard-ness	Nitrates
Federation, stored water, Jairosi	Treated Distribution	100	2	0	Clear	0	7.01	8.9	186	-	227.1	181	75	-
Federation, kiosk water	Treated distribution	100	0	0	Clear	0	7.45	9.9	255	-	252.8	278	76	-
Federation well, Mr Magola	Raw	100	30	5	Turbid /cloudy	58	6.50	2.9	419	-	512.4	398	60	-
Namachimba stream, Misesa	Raw	100	120	15	Clear	18	6.91	29.9	272	-	332.7	234	114	-
Kiosk water, Misesa	Treated	100	0	0	Cloudy	0	7.43	8.9	202	-	221	79	73	-

[81] Analysis for Blantyre by Mr Majawa, Assistant Water Chemist, Regional Water Laboratory.

VH Chiwembe well, Misesa (very deep brick-lined well)	Raw	100	44	9	Clear	70	5.76	40.9	785	-	958.2	88	75	-
Misesa, stored water (in sealed drum; Mai Magombo on VH Chiwembe plot)	Treated	100	0	0	Clear	0	7.19	8.9	925	-	1129.8	80	77	-
Tap water, Mai Matimati house, Zingwangwa	Treated	100	0	0	Clear	3	7.51	10.9	151	-	169.1	82	76	-
Stored water (open bucket), Mai Kaiya, Zingwangwa	Treated	100	0	0	Clear	0	7.79	15.9	271	-	325.4	85	80	-
Zingwangwa well, moulds growth at Stella Kondowe	Raw	100	108	12	Cloudy	10	6.83	11.9	468	-	571.3	106	102	-
Borehole water, Masjid mosque, Zingwangwa	Raw	100	61	9	Clear	0	6.28	54.9	712	-	869.5	204	210	-
Malawi Drinking Water Standard		100												
WHO Guidelines for Drinking Water Quality		100												

Annexe 2: Blantyre Water Board press release, July 2008



10 ADVERTISING

The Daily Times
Wed. July 9. 2008

BLANTRE WATER BOARD

TO ALL WATER KIOSKS' WATER SELLERS AND CONSUMERS

BLANTYRE WATER BOARD HAS LEARNT THAT MOST KIOSK OPERATORS HAVE ADJUSTED THEIR WATER SELLING PRICES WITHOUT ANY JUSTIFIABLE PROOF FROM THE BOARD AND ARE OVERCHARGING CONSUMERS.

WITH THIS DEVELOPMENT, THE BOARD IS ADVISING ALL CONSUMERS WHO BUY WATER FROM KIOSKS THAT KIOSK WATER TARIFF HAS NOT BEEN ADJUSTED. IT IS STILL AT **K44.00/M³** WHICH TRANSLATES TO **88 TAMBALA** PER 20L PAIL. ALL WATER SELLERS ARE SUPPOSED TO TAKE NOTE OF THIS AND ABIDE BY THE POLICIES OF THE BOARD.

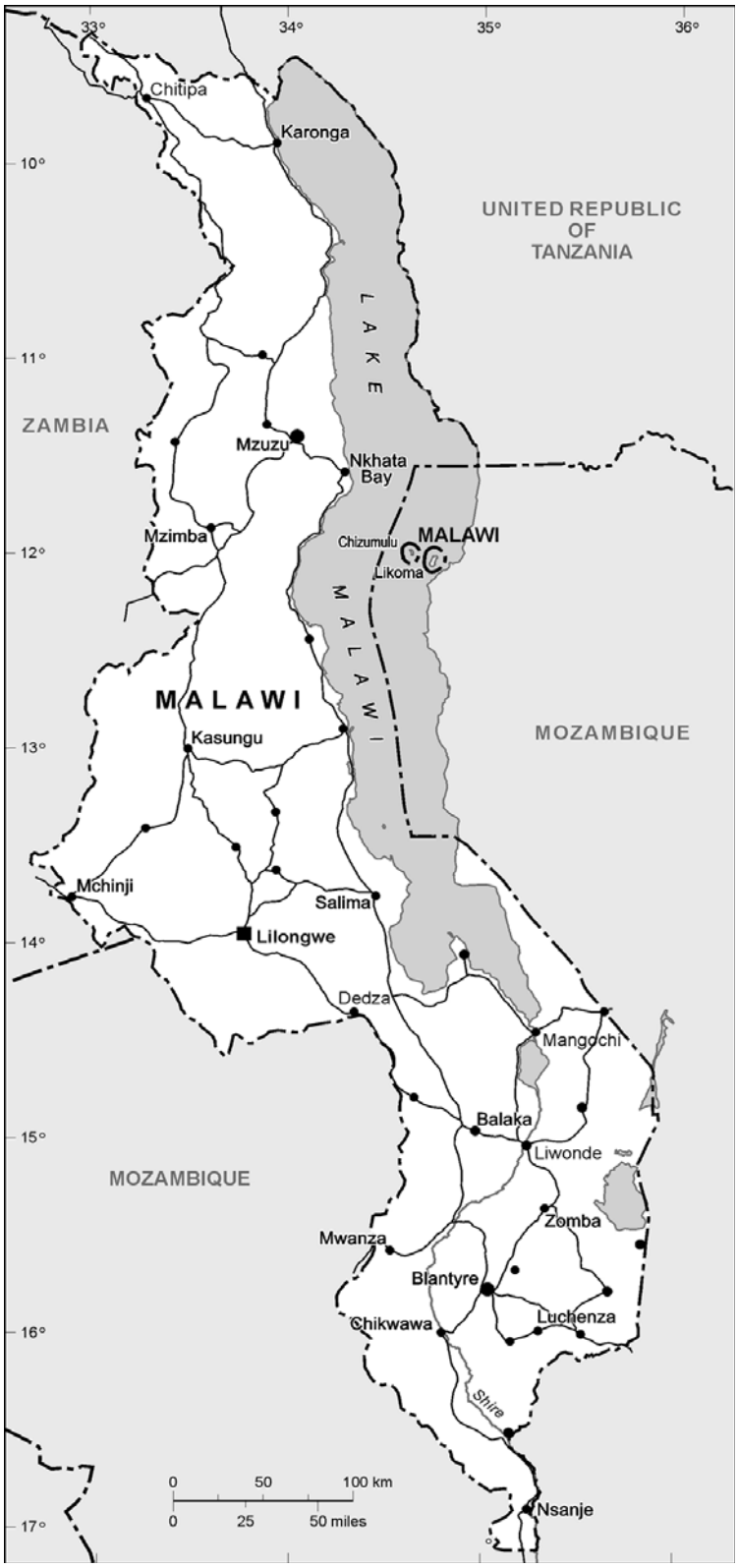
THE GOVERNMENT'S POLICY IS TO KEEP WATER KIOSK TARIFF AS LOW AS POSSIBLE AND AFFORDABLE TO ALL PERI-URBAN DWELLERS/CONSUMERS. ALL THOSE WHO HAVE RAISED THE SELLING PRICES SHOULD BE REPORTED TO THE BOARD IMMEDIATELY AND CONSUMERS ARE REQUESTED TO EXERCISE THEIR RIGHTS.

FOR MORE INFORMATION AND INQUIRIES, PLEASE CONTACT BWB KIOSK MANAGER ON **09 867 378 OR 01 872 000.**

WATER IS LIFE, LETS USE IT SPARINGLY

BWB MANAGEMENT

Annexe 3: Map of Malawi showing urban settlements



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