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Contents

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Introduction

Water is a basic human right as it is fundamental to life. It is a key asset for socio-economic growth and development at all levels, ranging from the national level to the individual. Access to water (and sanitation[1]) is a key factor in improving health, economic productivity and social well-being of the human populace as both social and economic activities rely heavily on the quantity and quality of water. Access to water is therefore an essential component of any effort to alleviate poverty. Although the proportion of the world's population using an improved[2] water source increased from 76% in 1990 to 89% in 2010, huge disparities between and within regions exists (UNICEF/WHO 2012). Comparatively, sub-Saharan Africa remains the area of greatest concern due to the following trends (Ibid.):

1. Four out of 10 people without access to improved drinking water live in sub-Saharan Africa. While coverage of improved water supply sources is 90% or more in Latin America and the Caribbean, North Africa and large parts of Asia, it is only 61% in sub-Saharan Africa.
2. A significant proportion of the urban poor in sub-Saharan African have *no* access to improved water sources. Over 90% of the richest quintile in urban areas use improved water sources, compared to only 64% of the people in the poorest quintile.
3. Countries that still have less than 50% coverage in water supply are almost all in sub-Saharan Africa.
4. The majority of countries lagging behind in meeting the Millennium Development Goal (MDG) target on drinking water are in sub-Saharan Africa.

A major cause of poor access to water services in sub-Saharan Africa has to do with the inefficiencies of water utilities, especially those that serve the urban areas. Many systems are characterised by high water losses, insufficient revenues to cover operating costs, dilapidated and poor functioning infrastructure, lack of investments, low billing and collection efficiency, chronic water shortages, failure to meet the existing demand, low coverage especially for the urban poor, and corruption, among others (see e.g. World Bank 2004).

Kenya is among the countries in sub-Saharan Africa where the proportion of urban population with access to improved sources of water has actually declined from 92% in 1990 to 82% in 2010 (UNICEF/WHO 2012). A study carried out in 2000 (Gulyani *et al.* 2005) in Nairobi, Mombasa and Kakamega concluded that "the current water supply situation [in the three urban centres] is dismal" (Ibid.: 27). Another study, undertaken in Kenya's three largest cities – Nairobi, Mombasa and Kisumu – in 2006 showed similar results (Citizens Report Card 2007). Furthermore, a comparison of the 'poor' and the 'non-poor' revealed that there were distinct inequities in access to 'mains connections' between these two groups, with the poor reporting lower access. The difference appeared to be particularly big in Kisumu, where only 7% of the poor reported having access to mains connections compared to 81% of the non-poor.

In 2005, UN-Habitat summarised the urban water supply situation in Kenya as follows: "Water supply in Kenyan cities is highly inequitable. Over 50% of the urban poor, living in slums, have no access to safe drinking water and end up paying vastly more for municipal piped

[1] As much as this paper concerns water, sanitation cannot be completely detached from water issues.

[2] According to UNICEF/WHO (2012) "improved" water sources are those that, by nature of their construction, are protected from outside contamination.

water" (UN-Habitat 2005: 5). In 2008, the Water Services Regulatory Board reported that "[I]n the low-income settlements where a majority of the urban poor live, only 20 per cent of the population have access to safe water, exposing them to relatively high tariffs charged by water vendors" (WASREB 2008: 1). The 2009 Kenya Population and Housing Census provides an even gloomier picture. Although the proportion of households with access to piped water is relatively high in most urban centres, majority of these households do not have individual connections to the house. Nationally, only 14% of the urban households are connected to piped water in the house. Furthermore, only 6.7% of households in the informal settlements and 16% in the formal settlements are connected to piped water in the house (Kenya forthcoming).

Since the 1970s, the Kenyan government - supported by western donors – has launched various attempts to reform its water sector, but results remained unsatisfactory.[3] According to the German donor involved (GTZ), this was largely due to the fact that the responsible water departments were fully controlled by the municipal authorities; hence the decision in 1995 to (at least partly) 'privatise' the sector with the creation of water and sewerage companies. Although these were still to be owned by the municipalities, they were also to be fully responsible for their own finances (Onjala 2002). This reform was formalised in the Water Act 2002.

Like other countries in sub-Saharan Africa, Kenya's socio-economic development goals are highly dependent on the availability of water in good quantity and quality. The government's long-term objective is to ensure that all Kenyans have access to clean potable water, and that water is available for key economic activities (MWI 2005; Kenya 2006b). The water sector reforms implemented in Kenya under the Water Act 2002 of the Laws of Kenya are designed to contribute to the realization of this long-term objective (see Kenya 2002). Under the Act, autonomous water and sanitation (or sewerage) companies – so-called WASCOs – are given the responsibility to provide water and sanitation services within urban areas. In other words, they are the direct Water Service Providers. The lead partners in this venture are normally the local authorities. The WASCOs operate within the jurisdiction and oversight of the Water Services Boards, instrumental in their registration, incorporation and monitoring. The Act requires that a Water Services Board enters into a contract with a Water Service Provider (WASCO) through a Service Provision Agreement. However, the Water Services Boards remain the legal owners of water and sewerage assets in their areas of jurisdiction (WASREB 2008: 2).

The WASCOs are expected to be managed on commercial principles, including signing performance contracts, cost-recovery and sustainability within a context of efficiency, operational and financial autonomy, accountability and strategic – but minor – investments. Yet, the key word is not 'privatisation' but 'commercialisation': water is considered by the Kenyan government as both a social *and* an economic good, to be available for all Kenyans and at a price reflecting its market value (cost recovery). Put differently, water services have to be managed "in accordance with sound business principles" (Section 57(5)(d) of the Water Act – Kenya 2002). As Wambua (2004: 7) argues, "through commercialisation, the Water Act 2002 requires local authorities to form autonomous water and sewerage companies with independent Boards of Directors to provide water services and re-invest (ring-fence) water revenues in service delivery improvement".

The government also recognises that the poor cannot afford to pay such prices, a problem that has to be solved by subsidised rates. Sections 11(1) and 11(2) of the Act laid the foundation for

[3] For an overview, see Owuor & Foeken 2009.

the *National Water Resources Management Strategy (NWRMS – 2006-2008)* (Kenya 2006a).[4] The overall goal of the Strategy is "to eradicate poverty through the provision of potable water for human consumption and water for productive use" (Ibid.: 4). In short, the WASCOs are supposed to improve access to water and sanitation services for poverty reduction and sustainable development. In fact, the core mandate of the WASCOs is to provide effective, efficient, adequate and safe water to all customers.

Water and sanitation services in Homa Bay municipality are provided by the South Nyanza Water and Sanitation Company (SNWASCO), while sewerage services are still under the Municipal Council of Homa Bay. SNWASCO started its operations in July 2006. Initially, water services in Homa Bay were under the Ministry of Water and Irrigation. SNWASCO operates in a cluster system comprising Homa Bay Water Supply (which serves the municipality) and four other water suppliers in neighbouring municipalities.[5] SNWASCO is a water service provider that falls under the Lake Victoria South Water Services Board (LVSWSB). As stipulated in the Water Act 2002, all assets of the company belong to LVSWSB, which means that the company cannot make any decisions regarding the assets – such as replacing defective equipment – without consulting with LVSWSB.

Besides the water sector reforms laid down by the government in the Water Act 2002, sector interventions by community-based organisations (CBOs), non-governmental organisations (NGOs) and development partners are also taking place in urban Kenya. Generally, water sector interventions can take the form of local (intra-urban) initiatives, for instance to establish a water kiosk in a low-income neighbourhood with the (financial) assistance of an NGO.[6] But interventions can also target a whole municipality or even a whole region, for instance the rehabilitation and/or improvement of the water (and sanitation) infrastructure. Perhaps the most far-fetching intervention project in urban East Africa is the Lake Victoria Region Water and Sanitation Initiative (LVWATSAN) being implemented by UN-Habitat.

In 2004, UN-Habitat, in association with the governments of Kenya, Tanzania and Uganda and with financial support from, amongst others, the government of the Netherlands, launched a major initiative (herein referred to as programme) to address the water and sanitation needs of the people, particularly the poor, in a number of secondary towns around Lake Victoria.[7] The programme involves a mix of investments in the rehabilitation and/or expansion of existing infrastructure as well as capacity building at local level and is designed to assist the people in the Lake Victoria towns to meet the water and sanitation related MDGs (UN-Habitat 2007, 2008, 2010a). In addition, the programme was designed to contribute to equitable and sustainable economic, social and environmental development of the Lake Victoria region, to the benefit of the inhabitants. The specific objectives of the programme (UN-Habitat 2008, 2010a) were:

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4 The NWRMS (2006-2008) is also based on three other policy papers: (a) *Sessional Paper No 1 of 1999 on National Policy on Water Resources Management and Development*; (b) the *Economic Recovery for Wealth and Employment Creation Strategy (2003-2007)*; and (c) the *Poverty Reduction Strategy Paper* (see Kenya 2006a: 3).

5 The other four are Mbita Water Supply, West Rachuonyo Water Supply, Oyugis Water Supply and Kendu Bay Water Supply.

6 A very successful example of a CBO-based water intervention in Kenya is the *Wandiege Community Water Supply Project* in the informal settlement 'Manyatta B' in Kisumu. See Owuor & Foeken (2012a, 2012b).

7 The Memorandum of Understanding signed between UN-Habitat and the governments of Kenya, Tanzania and Uganda in June 2006, provided the framework for the implementation and coordination of LVWATSAN.

1. Promote pro-poor water and sanitation investments in the secondary urban centres in the Lake Victoria region.
2. Support development of institutional and human resource capacities at local and regional levels for the sustainable delivery of improved water and sanitation services.
3. Facilitate realisation of upstream water sector reforms at the local level in the participating urban centres.
4. Reduce the environmental impact of urbanisation in the Lake Victoria basin.

The implementation of the programme in the selected urban centres was divided into two phases. The first implementation phase concerned short-term interventions for immediate impact, while the second implementation phase emphasizes long-term interventions, including training and capacity building. Initially, seven towns were selected for the first implementation phase of the programme, including Homa-Bay and Kisii in Kenya.[8] The short-term interventions were designed to increase the availability of water, to facilitate essential improvements in the water supply system and management, to extend water supplies to the poor areas of the towns, to provide urgently needed sanitation facilities, and to provide basic solid waste collection and disposal services in priority areas (UN-Habitat 2007). All these were meant to have an immediate impact in improving water and sanitation services in the selected towns.[9]

This paper focuses on one of the seven initially selected towns: Homa Bay. The paper has two broad objectives:

1. To describe the LVWATSAN programme water service interventions and implementation challenges in Homa Bay.
2. To describe and analyse the access to water situation of low-income households in Homa Bay.

The first objective, descriptive in nature and presented in Section 3, is based on interviews with the Managing Director of SNWASCO, the Clerk of Works of LVWATSAN-Homa Bay and the Secretary of the Homa Bay Multi-Stakeholder Forum.[10] For the second objective, a survey was carried out in 2010 in two (of the three) low-income settlements of Homa Bay, namely Sofia and Shauri Yako. The results of the survey are presented in Section 4. Before the two sections, the paper gives an overview of the importance of improved access to safe and affordable water to the livelihood of the urban poor.

2. Livelihood and water

Millennium Development Goal 1 calls for a reduction of 50% between 1990 and 2015 in the number of people whose income is less than US$1 a day and those who suffer from hunger. There is no doubt that important results have been realised towards achieving the Millennium Development Goals (MDGs). In sub-Saharan Africa, the proportion of people living on less

[8] The others were Nyendo/Masaka and Kyotera in Uganda, Bukoba and Muleba in Tanzania, and the Uganda-Tanzania border town of Mutukula. Three more towns were later added in the programme: Bondo in Kenya, Bugembe in Uganda, and Bunda in Tanzania.

[9] An additional 15 towns have been selected for the second phase of the programme (LVWATSAN II). These are Ngozi, Muyinga and Kayanza in Burundi; Keroka, Kericho and Isebania in Kenya; Nyanza, Kayonza and Nyagatare in Rwanda; Sengerema, Geita and Nansio in Tanzania; and Ntungamo, Mayuge and Buwama-Kayabwe-Bukakata in Uganda.

[10] The interviews were conducted in October 2008, September 2011, April-May 2010 and May 2012.

than US$1.25 a day has reduced from 56% in 1990 to 47% in 2008, while the proportion of people who are undernourished reduced from 31% to 27% over the same period (United Nations 2012). However, in spite of this achievement, the prevalence of poverty and hunger in sub-Saharan Africa remains widespread and highest in the world. Furthermore, given the pace of urbanisation, poverty is increasingly becoming an urban phenomenon. According to Satterthwaite (1997: 5), urban poverty in sub-Saharan Africa was "steadily and frighteningly on the increase during the 1980s and 1990s". Even though, in absolute terms, the rural poor still outnumber the urban poor, the latter group has been increasing at an alarming rate over the past few decades, a phenomenon commonly described as the 'urbanization of poverty' (Ravallion 2001).

In addition, urban areas were particularly hard hit by declining economies and the resulting structural adjustment policies, the cost of which were disproportionately felt by the urban poor (Rakodi 2002). Life in urban areas has become more expensive, while employment in the formal sector has decreased and real wages have not kept up with price increases or have even declined in absolute terms (see e.g. UNCHS/Habitat 1996; Simon 1997). In other words, many urban households have been faced with a serious decline in purchasing power. People have responded to this in a number of ways, with the diversification of income sources undoubtedly being the most notable (Bigsten & Kayizzi-Mugerwa 1992; Ellis 2000; de Haan & Zoomers 2003; Kaag *et al.* 2004). A wide range of activities are being employed, all in the informal sector (see e.g. Lee Smith & Memon 1994; Rogerson 1997; Hansen & Vaa 2004).

Kenya is a good example of this scenario. It is a rapidly urbanizing country. The urban population has increased from 285,000 people in 1948 to 3.9 million in 1989 and to 12 million in 2009. During the same period, the proportion of Kenyans living in urban areas increased from 5.3% to 18.1% and to 31.3%, respectively (Kenya forthcoming). The rapid growth of the urban population is partly caused by the influx of people from the rural areas looking for work in town. For cheaper housing, these people mostly end up in one of the many unplanned or informal settlements (or slums[11]). Their perspectives to find a job in the formal sector are bleak: since 1990, employment growth in the formal sector has been virtually zero, so it is the informal sector that absorbs most new job seekers (Kenya 2003), i.e. if they manage to find (or create) work at all. No wonder then that poverty – and urban poverty in particular – has been increasing.

Between 1992 and 1997, the percentage of Kenya's population living in absolute poverty rose from 42% to 53%, while urban poverty increased from 29% to 49% (Odhiambo & Manda 2003). In order to survive, people engage in all kinds of income-generating activities, such as some kind of small business, petty trade, farming (both in town and in the 'rural home') and merry-go-round groups (see e.g. Owuor & Foeken 2006). However, livelihood is not only about (access to) income-generating activities but is also about access to all kinds of provisions and services that determine the quality of life, water included.[12]

Rapid urbanization and unplanned growth have placed enormous pressure on the capacity of towns to provide these basic services for their growing populations. Local authorities, overwhelmed by the rapid and unplanned development of towns, lack the capacity or resources to address the widening demand-supply gap (UN-Habitat 2008). It is a well-known

[11] The terms 'unplanned settlement', 'informal settlement' and 'slum' are used interchangeably in this paper.

[12] For a more detailed description of the concept of livelihood, see e.g. Kaag *et al.* (2004) and de Haan & Zoomers (2003). On urban livelihoods in developing countries, and sub-Saharan Africa in particular, see e.g. Rakodi & Lloyd-Jones (2002).

fact that most slums – i.e. those parts of cities and towns where the urban poor live – lack such basic facilities as roads, water supply, sanitation, solid and liquid waste disposal, electricity, schools and hospitals, among others. Yet access to such facilities has a direct impact on people's well-being (health, nutritional condition, education) and an indirect impact on their income generation. For instance, a person with good education and in good health is likely to perform better than a person lacking these qualities. Also, the production capacity of a small business can improve considerably when electricity and/or water are available throughout the year.

Among the challenges facing sub-Saharan Africa, provision of safe water and adequate sanitation are of the highest priority. Even where there is water, the quality is often poor, leading to exposure to water-borne diseases. The Human Development Report 2006 stresses that the crisis in water and sanitation is above all a crisis for the poor. It further states that almost two in three people lacking access to clean water survive on less than US$2 a day, with one in three living on less than US$1 a day (UNDP 2006). Moreover, "the poorest people not only get access to less water, and to less clean water, but they also pay some of the world's highest prices" (Ibid.: 7). The latter applies particularly to the urban poor, mainly because they are often forced to buy water from private water vendors (see e.g. Kjellén & McGranahan 2006).

According to UN-Habitat (2007), the urban poor get their water by queuing for hours to collect water from standpipes or illegal connections. Others buy their water from vendors who can charge up to twenty times more for water than the price paid by their wealthier neighbours. As such, not only do the poor suffer financially; they also suffer poor health from using unsafe water and poor sanitation facilities. It is estimated that "at any one time, close to half the population in Africa, Asia and Latin America suffer from one or more of the main diseases associated with inadequate water and sanitation" (Ibid.: 6). A survey conducted in Nairobi's informal settlements revealed that the infant and child mortality was 35% and the prevalence of diarrhoea among children was 32%, the latter being double the rate for Nairobi as a whole and the national average (APHRC 2002).

As indicated earlier, water is a key asset for socio-economic growth and development at all levels. In Kenya, a stage has been reached where availability of water is the limiting factor for any development activities (Kenya 2006b). Improved access to safe and affordable water, especially to the urban poor, is likely to have an impact on their livelihood, directly or indirectly, in at least three ways (UN-Habitat 2006: 28-29):

- It has a positive impact on health (and, as a consequence, nutrition), which increases time and energy to invest in productive activities.
- Closer proximity of water sources and increased quantity available reduces the time necessary to fetch water.
- Improvements are especially relevant for women, who are traditionally responsible for looking after ill relatives, and for fetching water for the whole household.

In other words, improved access to safe and affordable water at the household and individual level is likely:

- To *reduce* the time spent on fetching or queuing for water, waterborne diseases,[13] child morbidity, expenditure on water, and water-related conflicts.

[13] The most common waterborne diseases in Kenya include malaria, typhoid, cholera, diarrhoea, dysentery, bilharzias and worms (Kenya 2006b).

- To *increase* the girl-child's school attendance. This is because girls are sometimes forced to be late or miss school to help their mothers fetch water.
- To *improve* household's health conditions.

In terms of economic production at the level of the business and/or household, at least two more benefits can be mentioned:

- Depending on the nature and size of the business, micro and small enterprises may benefit. This was for instance shown by a comparative study in two small towns in Uganda (Davis *et al.* 2001).
- Urban farming, which is a very common and important livelihood activity for many of the urban poor, becomes much less dependent on (often unreliable) rainfall. A study in Nakuru town (Kenya) showed that mean crop harvests from urban plots were substantially higher when irrigation was practiced (Foeken 2006: 60).

Moreover, the time, energy and resources spent on some of the activities linked to poor access to water can be used on such and other productive economic activities, especially for the girl-child and women who bear the primary responsibility for water at the household level (UN-Habitat 2008). Women devote a good deal of their time and their physical effort to supplying the family with water, and express a genuine demand for improvements in the water supply and sanitation of their home.

However, women and the poor, including other vulnerable and disadvantaged groups, are often excluded from decision-making, yet they are the most affected by lack of water and sanitation services (UN-Habitat 2008). Poor urban dwellers, like everyone else, are entitled to reliable, affordable, well-managed and sustainable water supply and related services (UN-Habitat 2007). On a more positive note, UN-Habitat's 2006 *Global Report on Water and Sanitation in the World's Cities – Local Action for Global Goals*, noted that "inadequate water supply is not mainly due to a lack of government funds. Indeed, in many cities and smaller urban centres, it is possible to improve provision of water in low-income settlements while charging their inhabitants less than they currently pay for inadequate provision" (Ibid.: 6).

3. The Lake Victoria Region Water and Sanitation Initiative in Homa Bay

Homa Bay

Homa Bay, the headquarters of Homa Bay County, is located in the western part of Kenya on the shores of Lake Victoria, some 100 km south of Kisumu and about 400 km west of Nairobi. The municipality covers an area of 23 km^2 of which 3 km^2 consists of the central business district.[14] The municipality is divided into six local government administrative wards, namely Market, Posta-Bonde, Katuma, Kanyabala, Kanyadier-Kothidha and Kanyango-Kalanya. With a population of about 60,000 people in 2009, Homa Bay is primarily an administrative centre with small-scale trading as the dominant economic activity. Notably is the trade in fish, especially near the fish-processing factory, whereby fish is brought to the town by fishing boats from elsewhere. The three low-income settlements in the municipality are Makongeni on the northern side of the town and Shauri Yako and Sofia

[14] There are conflicting figures about the exact area of Homa Bay municipality.

on the southern side. As indicated above, water and sanitation services in the municipality are provided by the South Nyanza Water and Sanitation Company (SNWASCO), while sewerage services are still under the Municipal Council of Homa Bay.

In 2006, UN-Habitat carried out a general survey in Homa Bay on access to water sources and sanitation facilities, amongst others.[15] One-quarter of the households availed of piped water into the premise (i.e. either the house or the yard), but this percentage was much higher for the non-slum households (47%) than for the slum inhabitants (21%). Hence, the majority of the Homa Bay households relied on water sources outside their compounds, especially public standpipes (40%) and surface water (15%). The latter was mostly water directly from the lake, which was only done by slum inhabitants. For the majority of the slum households (58%), it took at least half an hour to fetch water and for one-third of them even at least one hour. Disruptions in the supply of water were common: almost 60% of the households reported a disruption during the two weeks preceding the interview. As for sanitation facilities, one-fifth of the Homa Bay households had access to some kind of flush toilet, mostly among the non-slum inhabitants. The slum households relied on pit latrines (51%), while almost one-third indicated to have no access to any sanitation facility. The majority of those who did have access shared the facility with other households. This was very common in the slum areas (72%), where almost one-fifth of the households with access to a facility shared with at least ten other households.

The LVWATSAN programme short-term interventions

Since the start of the implementation phase in 2006, the LVWATSAN programme has initiated a number of short- and long-term water and sanitation interventions in Homa Bay municipality. Like in other programme towns, LVWATSAN's interventions in Homa Bay town have been guided by the programme's objectives and implementation strategy. As such, the programme has worked in close collaboration with the Municipal Council of Homa-Bay, SNWASCO and the Homa Bay Multi-Stakeholder Forum (MSF-Homa Bay).[16]

The following short-term interventions in the Homa Bay water supply system, intended for immediate impact, had successfully been completed by the end of October 2008:[17]

1. Rehabilitation of the old and new water intake points (from Lake Victoria; Photo 1) and installation of new water pumps to increase the volume of water supply in the municipality. This has improved the daily water production from 1,500 m^3 to 3,000 m^3. However, the production is still far below the estimated demand of about 18,000 m^3 per day. In 2008, pumping of water from the intake point to the treatment plants was done every day at night for only 8 hours. This was intended to cut down on the high electricity

[15] The data presented in this section is based on excel summaries of the survey results as sourced from UN-Habitat (Nairobi Office). The UN-Habitat conducted a series of urban inequity surveys (UIS) in all its programme towns to assess, among other things, access to water situation and sanitation.

[16] MSF-Homa Bay is discussed below.

[17] Other interventions included: (1) Supply of tools and equipments, including small tractors to the municipal council to improve efficiency in sanitation services, especially in solid waste management and refuse collection. This is complemented by the construction of strategic refuse collection and transfer points, promoting sorting of wastes and capacity building in all aspects related to the tools, equipments and tractors. (2) Construction of the so-called VIP (ventilated improved pit) latrines in selected schools, churches and individual plots within Makongeni, Sofia and Shauri Yako for demonstration purposes. By 2008, there was one such latrine in Makongeni, eight in Shauri Yako and one in Sofia.

bill incurred by the company and also to counter the problem of low voltage of power from the main grid.

2. Construction of two water kiosks in Shauri Yako estate to increase access to clean water in the low-income areas (kiosks 1 and 2 on Maps 1 and 2 below; see Photo 2). These water kiosks were handed over to MSF-Homa Bay to determine which of their group members to run them. After the opening of the kiosks, consumers were charged a very low rate of Ksh 2 per 20-litre container. However, a tour of Shauri Yako in October 2008 revealed that both kiosks had not been 'fully' operational since they were 'officially opened' (see Box 1).

Photo 1 The rehabilitated new water intake (2008)

Photo 2 The NCPB water kiosk in Shauri Yako (2008)

3. Rehabilitation of the old water treatment works at Makongeni to increase efficiency and reduce wastage – and consequently unaccounted-for-water. The 'old' treatment works constructed in 1956 has a capacity of about 900 m^3 of water per day, while the 'new' treatment works constructed in 1987 has a capacity of about 2,000 m^3 per day.
4. Supply of bulk and individual consumer meters to SNWASCO to improve their metering, billing and efficiency. The programme supplied 500 individual meters to SNWASCO to replace the ones that were not working. The priority areas for replacement of non-functional meters were water kiosks, hotels, government departments and standpipes.
5. Capacity building in management, operation and maintenance for SNWASCO staff to improve their delivery of water and sanitation services to the municipality.[18]

Box 1: 'The politics of water in Homa-Bay'[19]

A water kiosk, a water point or a standpipe with running water is a lucrative business in this town. There are six water points (i.e. standpipes) licensed by the water company but privately-run by well-connected individuals, including former and current councillors. Some corrupt officials of the water company collude with these individuals to create an artificial water shortage in the municipality by frequently closing the piped water distribution lines serving areas where the privately-run water points are located. On the other hand, the same water company officials conveniently leave the separated distribution lines to these water points open. Apparently, the separation of the distribution lines was not by default but by design from the period the municipal council was still in charge of water services. With the only source of water being the water points, these individuals are able to charge Ksh 10 for a 20-litre container – far much higher than what is recommended by the water company. With the construction of the LVWATSAN water kiosks, the individuals operating the privately-run water points thought that they would soon run out of business. This is because a 20-litre container of water would cost Ksh 2 at the LVWATSAN water kiosks – far much cheaper than what they charge. On the day of the official opening of the LVWATSAN water kiosks, there was plenty of water. The next day, however, the (separate) distribution line supplying water to the LVWATSAN water kiosks was closed, while the one to the privately-run water points remained opened. Again, the separation of the distribution line was conveniently done during connection. In other words, the same (corrupt) officials from the water company protected the interests of the individuals running the water points. Since then, the LVWATSAN water kiosks have remained dry. However, the LVWATSAN programme (or UN-Habitat) is not willing to be dragged into the local water politics. MSF-Homa Bay has taken over the matter and a solution is being sought through the Project Implementation Unit meetings and other channels. In short, the poor are yet to benefit from these water kiosks. In addition, the idea of pumping water for only 8 hours is also a scheme to create an artificial water shortage so that the individuals running the private water points would continue having a thriving business.

Despite these short-term interventions, by October 2008, the Clerk of Works, LVWATSAN-Homa Bay, described the municipality's water situation as still "very acute" because only about 30% of the households had connections to the distribution network.[20] Although the piped water distribution network covered some parts of the low-income estates, only a few individuals and water kiosks were connected. A large majority of the population relied on water kiosks or other water sources. Even then, because of the on-going water

[18] Capacity building was also done for the Municipal Council of Homa Bay staff, MSF-Homa Bay and local NGOs and CBOs.
[19] As described by the Secretary, MSF-Homa Bay (Interview, 16 October 2008).
[20] Interview, 15 October 2008.

rationing, these estates received water only for one, two or three days in a week – a situation experienced even before the reforms.

There were about 3,000 water connections in the municipality, mainly concentrated in the town centre, hospital and prisons areas. A large number of these consumers were still paying for water on a flat rate basis because of lack of meters or non-functioning meters.[21] For example, out of the 918 connections on a flat rate tariff, in 752 cases this was because their meters "stopped working long ago". Furthermore, according to the Secretary, MSF-Homa Bay,[22] the billing was very inefficient because most consumers did not receive their bills on time. In addition, water supply was very unreliable due to the frequent water rationing necessitated by the high cost of electricity needed to pump enough water from the intake point. While the town centre, the hospital and prisons received water on a daily basis, other parts of town were subjected to water rationing based on a schedule determined by SNWASCO.

The proportion of unaccounted-for-water is still high (45%),[23] despite dropping from 65% since the SNWASCO started its operations. The lack of leak detectors was a major contributing factor to the high level of unaccounted-for-water, besides the rampant illegal collections. As such, the company started door-to-door impromptu checks for illegal connections in the municipality.

The Homa Bay Multi-Stakeholder Forum[24]

In order to encourage community participation in and ownership of the LVWATSAN interventions, the Homa Bay Multi-Stakeholder Forum (MSF-Homa Bay) was created in 2004 when the LVWATSAN programme was launched in the municipality. The MSF is a pro-poor governance mechanism intended to include and involve the poor people and all stakeholders in decision-making on matters concerning them. Key stakeholders represented in the MSF are key government ministries, civil society (NGOs, CBOs and churches) and community-based groups (e.g. women and youth groups). Membership is open to any interested organisation and group as long as they meet the forum's membership requirements.

The MSF was initially viewed with suspicion, especially by the local authority councillors who perceived the forum as an emerging force to usurp their power and responsibility in running municipality affairs. In fact, the councillors strongly resisted the idea, terming it a parallel authority. After some lobbying and consensus building, it was decided that all the councillors become members of the forum and that the Mayor be the Chairperson. This decision reduced the councillors' suspicion and opposition to the forum's operations. Yet, despite the seemingly good working relationship between the forum and the municipal council, a proposal to (legally) institutionalize MSF-Homa Bay (through a council by-law) was strongly opposed by the councillors. Instead, in one of its council resolutions, the council recognized the existence, operations and activities of the forum within the municipality and as a "partner in development". This implies that MSF-Homa Bay has some quasi legal status

[21] A flat rate tariff is where the consumer is charged a fixed monthly rate irrespective of the amount of water consumed – normally for non-metered customers.

[22] Interview, 16 October 2008.

[23] See UN-Habitat (2010a).

[24] This section is based on an interview with the Secretary, MSF-Homa Bay, 16 October 2008. For a more detailed discussion of MSF-Homa Bay, see Owuor & Foeken 2009, pp. 51-53.

at the municipality level. It is almost impossible to start a project in the municipality without involving the forum at all stages.

The MSF-Homa Bay has three committees that run the 'technical' affairs of the forum: the infrastructure committee, the communication and awareness committee and the capacity-building committee. All deliberations at the committee level are brought to the 'general assembly' for further deliberation. The general assembly, which is called when need arises, brings together all members of the forum. The views expressed in the general assembly are incorporated in the concerned committee's report before being forwarded to either the Project Implementation Unit[25] or a full council meeting. While most of the forum's proposals are normally approved at the full council meeting and then implemented, some are modified or rejected. In a few instances, MSF-Homa Bay has lobbied against some unpopular council decisions. For example, a proposal to locate 10 latrines in Shauri Yako, with one of them in a councillor's compound, was rejected by the people (through the forum) because "they had not been consulted by the council to determine where to locate the toilets".

The LVWATSAN programme long-term interventions[26]

The major long-term intervention consisted of the extension of the piped-water distribution network into the lower-income areas[27] and the construction of 10 water kiosks in addition to the first two. This took much longer than anticipated, which was due to two factors: the land issue and (to a lesser extent) the ownership issue. The land for constructing the water kiosks had to be negotiated with the land owners. This is not only because residential land in Homa Bay is privately owned, but also the fact that the water kiosk will be a public utility in a private property. Constructing the water kiosks on road reserves and way leaves (municipality land) was not an option because of the risk of demolition during road construction or expansion.[28] After lengthy discussions and negotiations with land owners at different periods in time, all 12 kiosks except one (the NCPB kiosk) are on private land.[29] As a 'reward' for 'donating' part of their land for the construction of water kiosks, the 11 land owners got a private connection to the kiosk in the form of a standpipe in their compound (with a meter). The situation was even more complex when water pipes had to pass through several homes.[30]

Ownership and management of the water kiosks has to be in the hands of a community-based group. Usually, this is not challenged. In September 2011, however, two MSF members who donated land for a kiosk had appeared to be of the opinion that owners of land where the kiosks are constructed should also be the ones who operate and manage the kiosk.[31]

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[25] The Project Implementation Unit (PIU) is the technical implementing arm of all LVWATSAN activities. The PIU in Homa-Bay is chaired by the Town Clerk, while the managing director of SNWASCO is the secretary. Other members are the District Public Health and Sanitation Officer, the District Water Officer, the Chairman and Secretary of the MSF-Homa Bay and the LVWATSAN Clerk of Works, among others.

[26] This section is based on interviews with the Clerk of Works of LVWATSAN-Homa Bay and the Secretary of MSF-Homa Bay in September 2011 and May 2012 and with the Managing Director of SNWASCO in May 2012.

[27] The distribution network in upper Sofia was expanded by 800 metres pipeline.

[28] This shows the lack of intra-government cooperation at the local level, in this case between the Ministry of Water and the Ministry of Roads.

[29] Given its mandate, MSF-Homa Bay played a critical role in these negotiations.

[30] There was an instance when the programme was forced to 'by-pass' a pipe from a home, making it more expensive than originally budgeted for.

[31] These two members were a local authority councillor and a provincial administration chief.

There was disagreement because this would be very much contrary to the programme's pro-poor objective, i.e. the kiosks have to be operated by the community by means of groups (women groups, youth groups). In the end, the problem was solved.[32]

The selection of the groups to operate the kiosks is the responsibility of the MSF: with public announcements, groups can apply. To qualify, groups have to fulfil various requirements (Photo 3): they must be active and functional for at least two years, they must be registered by the Ministry of Culture and Social Services and by the Homa Bay Municipal Council, they must have a bank account for at least one year, they must come from within the vicinity of the water kiosk concerned, they must be engaged in environmental activities, and they must be ready to purchase a water meter if asked to do so.

MULTI STAKEHOLDERS FORUM
P.O. BOX 469
HOMA BAY.

PUBLIC NOTICE

REF: WATER VENDING KIOSK NEXT TO NATIONAL CEREALS & BOARD.

The public is hereby informed **THAT** Multistake Holder Forum in conjunction with South Nyànza Water Services Company Limited do hereby invite applications from interested and eligible CBO's to run water vending kiosk opposite NCPB.

REQUIREMENTS & QUALIFICATIONS
- **MUST** be active and functional
- **MUST** have been operating for at least two (2) years
- **MUST** be registered by Ministry of Culture and Social Services and Homa Bay Municipal Council.
- **MUST** have a Bank Account for at least 1 (one) year.
- **MUST** come from within the vicinity of the water kiosk i.e. within the Municipal Council of Homa Bay.
- **MUST** be doing environmental activities
- **MUST** be ready to purchase meter if asked to do so.

The applications to be in triplicate.

The applications to be addressed to or hand delivered to:-
The Secretary,
Multistake Holder Forum,
P.O. Box 469,
HOMA BAY *(1st Floor, Room 13, Homa Bay Municipal Council Offices)*

The same should reach him on or before ***9th October 2007.***

MSF reserves the right to accept or reject the application.

Photo 3 MSF notice for water vending kiosk

Mixed reactions, expectations and realities?

Whereas the LVWATSAN interventions at the municipality level are being applauded, some residents in Sofia and Shauri Yako say that they are yet to "feel" the benefits of the water kiosks.[33] For others, the implementation of the programme has been "rather slow than initially expected" and "there is little to celebrate about at the moment". The Clerk of Works of LVWATSAN-Homa Bay attributed these "delays" to long negotiations for land to put up

[32] The kiosk on the councillor's place was operated by a women's group and the one on the Chief's place by the Chief's brother who lives there and who is a member of a self-help group.
[33] This paragraph is based on interviews conducted in May 2010.

the water kiosks as well as complex and long procurement, tendering and contracting procedures. Furthermore, it is the mandate of the local community to manage the water kiosks (through MSF-Homa Bay) and SNWASCO (as a service provider) to make sure that the kiosks have adequate and reliable water supply.

Table 1 gives a summary of the status of the LVWATSAN water kiosks in Homa Bay by May 2012. This is based on interviews with the Managing Director of SNWASCO, the LVWATSAN Clerk of Works and the Secretary of MSF-Homa Bay. Regarding some kiosks, there was no difference of opinion, but regarding others there was, at least from one person, which is an interesting finding as such. In some cases, there appeared also to be different views as to why some kiosks were not connected or (fully) operational. The table is therefore a summary of consensus on opinion by three or two of the interviewees. Of the 12 kiosks (see also Map 1), five were not yet connected to the pipeline, while three were connected but have never been fully operational. Only the original two kiosks in Shauri Yako (Koginga Beach and NCPB) and Got Rabuor kiosk in Makongeni have been operational – at least for some time (see Photo 4).

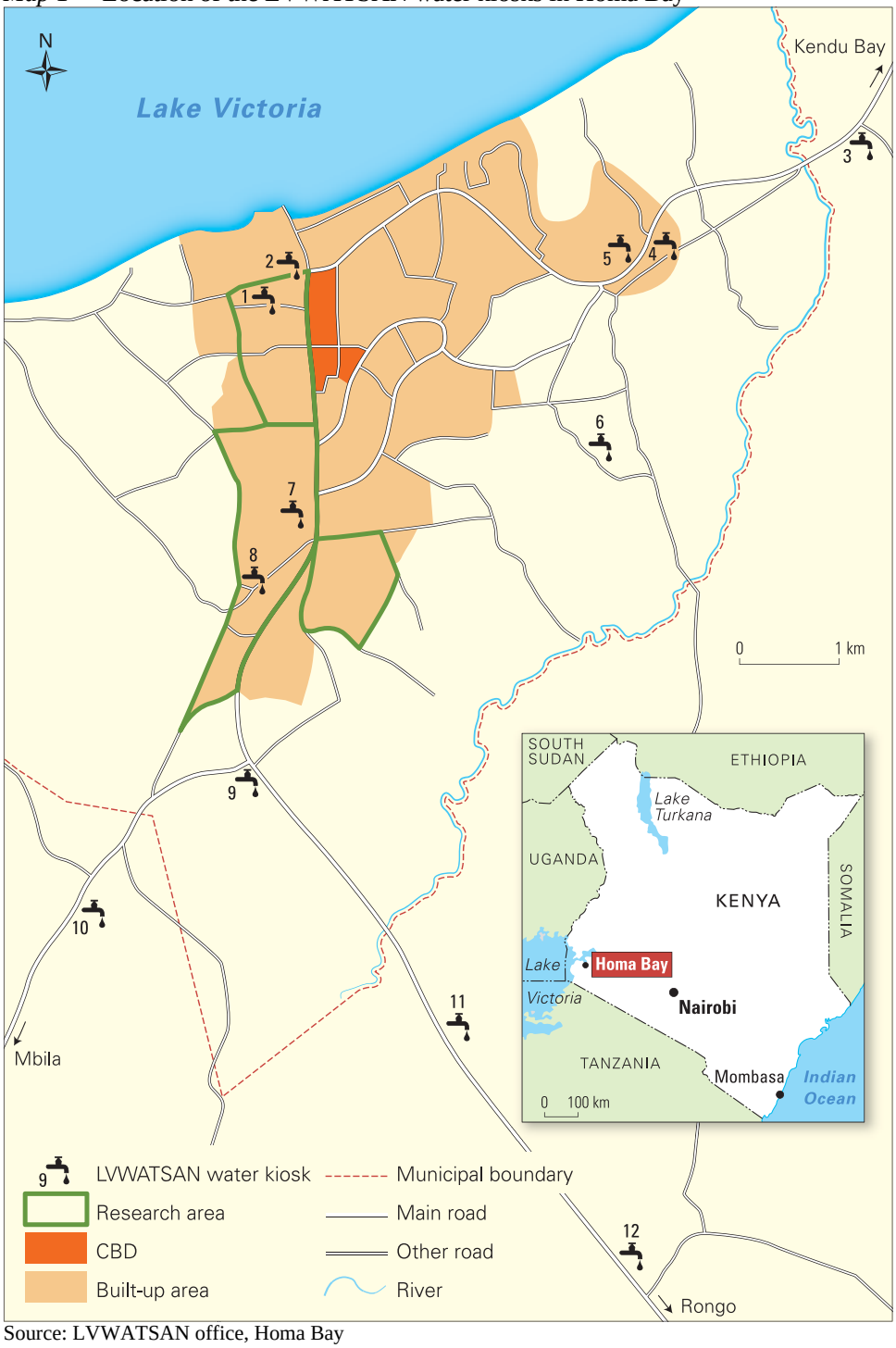
Table 1 Status of the LVWATSAN water kiosks by May 2012

Kiosk	**Location/Estate**	**Remarks**
1. Koginga Beach	Shauri Yako	Connected and operational; has a special pipeline, apart from the existing mains
2. NCPB	Shauri Yako	Same as Koginga Beach kiosk
3. Wahambla	Nyalkinyi	Not connected; no pipeline to the kiosk
4. Kapita	Makongeni	Connected but not fully operational; inadequate supply of water
5. Got Rabuor	Makongeni	Connected and operational; has a reliable flow of water
6. Kongelo Kalanya	Makongeni	Connected but not fully operational; pipeline destroyed during the construction of Homa Bay – Kendu Bay road; pipe reconnected but has low pressure
7. Lower Sofia	Sofia	Connected in January 2012 but not fully operational; pipeline destroyed during the construction of Homa Bay – Rongo road; reconnected but has no constant/adequate flow/supply of water due to too many individual connections on the pipeline
8. Upper Sofia	Sofia	Same as Lower Sofia kiosk
9. Mbita Junction	Sofia	Not connected; needs a new pipeline; the water tank and pipeline that are supposed to supply the kiosk with water are old and not functioning (well)
10. Radiro Junction	Otulbum	Same as Mbita Junction kiosk
11. Arujo	Arujo	Same as Mbita Junction kiosk
12. Kabunde	Kabunde	Same as Mbita Junction kiosk

Source: Interviews, May 2012

To improve adequacy and reliability of water supply to the kiosks, the LVWATSAN programme is constructing two (more) water storage and distribution tanks, specifically for the water kiosks. This, however, implies designing a water (re-)distribution network. This is the only way the water kiosks can be sustainable and perhaps 'by-pass' the 'politics of water' in Homa Bay town as described in Box 1 above.

Map 1 Location of the LVWATSAN water kiosks in Homa Bay



Source: LVWATSAN office, Homa Bay

Photo 4 Koginga Beach water kiosk when it was non-operational (2008)

4. Access to water in Homa Bay: Results of a survey

Introduction

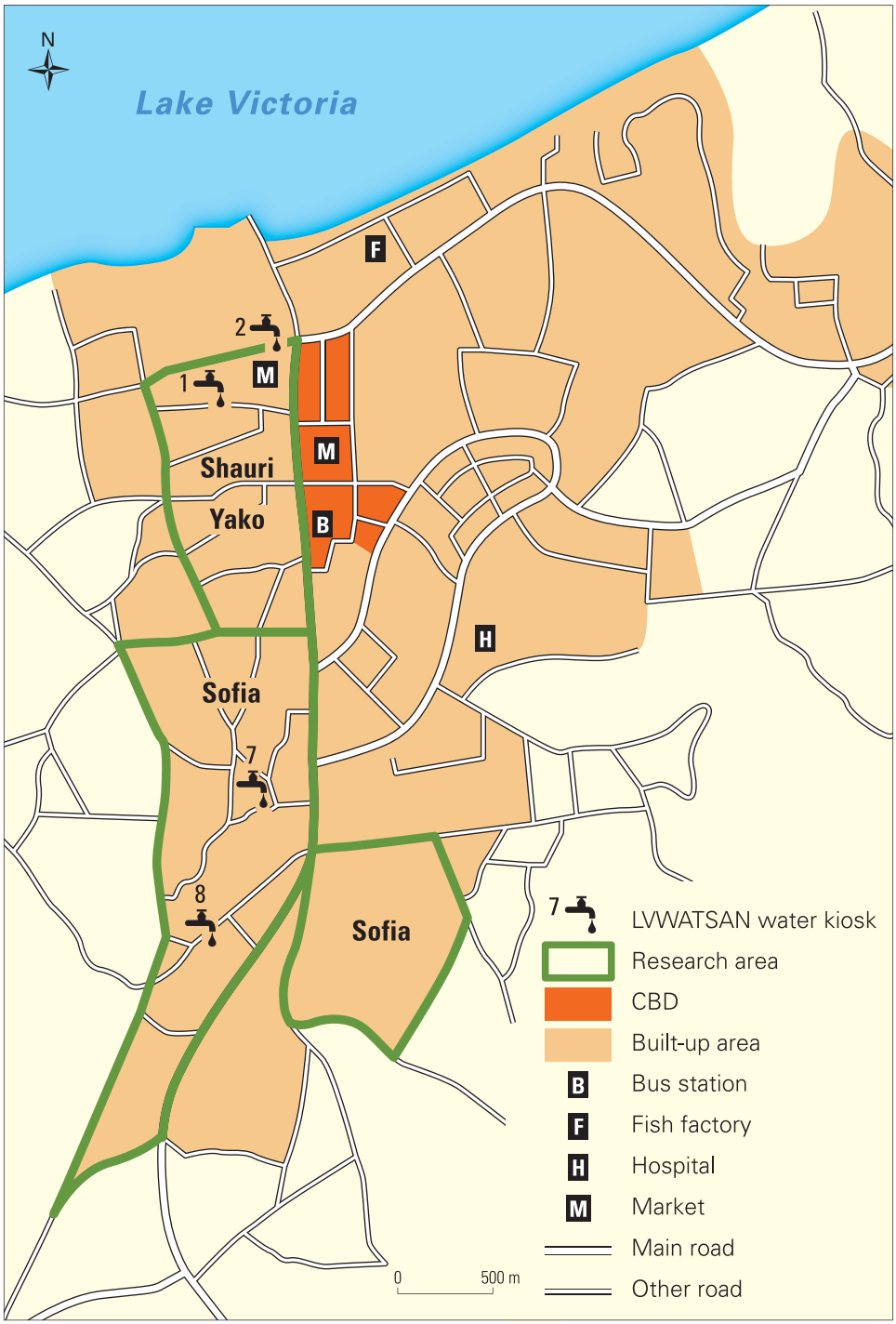
In April and May 2010, a survey to determine households' access to water was carried out in two of Homa Bay's three low-income areas: Sofia and Shauri Yako. A total of 231 households were interviewed using a standardized questionnaire. The households were selected using a stratified random sampling procedure. Guided by the experience and knowledge of officers from Homa Bay Municipal Council, the two settlements were conveniently stratified into smaller, manageable and homogeneous research clusters: three in Sofia and four in Shauri Yako (see Map 2). An almost equal number of households were thereafter randomly selected and interviewed in each cluster – except in two relatively large ones that had more respondents.[34] At the end of the survey, a total of 97 households were interviewed in Sofia and 134 in Shauri Yako. The two settlements are located in the same stretch and local government administrative ward: Posta-Bonde.

There are four LVWATSAN water kiosks in the study area (Map 2): Lower Sofia and Upper Sofia in Sofia and Koginga Beach and NCPB in Shauri Yako. According to the original time schedule of LVWATSAN, all four water kiosks should have been fully operational by the time of the survey. However, this was only the case in Shauri Yako. The two Sofia kiosks were among the ones whose construction was seriously delayed due to the land issue described above.[35]

[34] The number of respondents interviewed in each cluster was as follows: Sofia 1 (31), Sofia 2 (25), Sofia 3 (41), Shauri Yako 1 (38), Shauri Yako 2 (31), Shauri Yako 3 (33) and Shauri Yako 4 (32).

[35] For that reason, a smaller follow-up survey is planned in the area around the two Sofia kiosks as soon as these have been operational for some time, in order to 'measure' the impact of these two kiosks on the livelihood of the households in the area.

Map 2 Location of study areas



Household characteristics

Both Sofia and Shauri Yako are known as low-income areas. This is confirmed by the relatively low percentage of households owning the house they live in and the relatively low average household welfare index (HWI) (Table 2). However, these figures obscure the HWI variation that exists in both areas. For instance, while almost 3 out of 10 households could be

labelled as “very low” in terms of HWI, 2 out of 10 were classified as “high” (see Annex 1, Table A.1). On the whole, Sofia appeared to be somewhat less ‘poor’ than Shauri Yako, given the differences in average HWI and the percentages with a “very low” HWI. This overall finding was in line with the data regarding the occupational status of the household head (Annex 1, Table A.2). Whereas in Sofia, 40% of the household heads were regularly employed in the formal sector, in Shauri Yako this was the case with only 16% of the heads. In the latter area, the majority of the household heads relied on some kind of self-employment for their livelihood, which in practice means mostly some small kind of business with a low and irregular income. Given an average household size of almost 5 members (Table 2) and in several cases more (Annex 1, Table A.1), many of the households in the two settlements might be barely surviving on such low and irregular incomes.

Table 2 Household characteristics by area

	TOTAL (N=231)	Sofia (N=97)	Shauri Yako (N=134)
Tenure status: % own house	26.0	29.9	23.1
Average Household Welfare Index*	14.2	16.1	12.9
Average household size (members)	4.6	4.8	4.5

* Range from 0 to 50; for calculation, see Table A.1 (Annex 1).
Source: Table A.1 (Annex 1).

Access to water sources

In the survey, each respondent was asked to mention the various water sources the household used and thereafter what he/she considered as the household’s main water source. The results are shown in Table 3, distinguishing between *main* and *other* water sources. As for the *main* water source, the large majority (over 90%) of the households in the two areas had access to piped water. However, the most elaborate way of accessing water is a connection in the house or otherwise in the compound. Like in most informal settlements, less than 20% of the households enjoyed the convenience of having piped water in the house. On the other hand, more than 40% of the households had access to piped water in the compound (“piped water – on plot”). This is less than the number of households who did have access to piped water, but at some distance (“piped water – off plot”). Most of the latter households (63%) could get piped water from a neighbour, while another 20% went to a private water kiosk. Only two respondents (both in Shauri Yako) mentioned a water kiosk operated by an NGO as the household’s main water source. This is because these two kiosks (Koginga Beach and NCPB; see Map 2) are located near the market and largely serve the business people. They are relatively far from the residential areas and may not be frequently used by households as a daily source of water – at least when other, nearer sources are available. Finally, for 10% of the Sofia households, private water vendors were mentioned as the household’s main water source. Since water bought from private vendors is the most expensive water source (see below), this may be an indication of the difficult water situation in this area.

Table 3 Access to water sources by area (%)

	TOTAL (N=231)	Sofia (N=97)	Shauri Yako (N=134)
Main water source			
piped water – on plot[1]	41.6	34.0	47.0
piped water – off plot[2]	50.6	48.5	52.2
private water vendors	4.3	10.3	0
roof catchment / rain water	2.6	6.2	0
surface water (lake)	0.4	0	0.7
other[3]	0.4	1.0	0
Total	100	100	100
Access to piped water in the house	*18.6*	*13.4*	*22.4*
Other water sources[4]			
piped water – on plot[1]	1.7	2.1	1.5
piped water – off plot[2]	12.6	20.6	6.7
private water vendors	29.4	48.5	15.7
roof catchment / rain water	87.9	87.6	88.1
surface water (lake)	32.0	20.6	39.6
other[3]	6.9	15.5	0.7
Average number of water sources	*2.7*	*3.0*	*2.5*

Notes:
[1] Individual, landlord.
[2] Neighbour, public standpipe, water kiosk (Council/NGO/private).
[3] Borehole, shallow well, river water.
[4] Totals add up to more than 100%.
Source: Table A.3 (Annex 1).

As mentioned earlier, most parts of the municipality – except for the CBD, hospital and prisons – suffer from water rationing based on a schedule determined by SNWASCO. Sometimes, water rationing, coupled with low pressure, is so acute that taps in Sofia and Shauri Yako run for only two or three days a week and not even during the whole day. Water rationing is not only a problem for the water kiosks, but certainly also for the households whose main water source is any type of piped water. Only one-quarter of the respondents said that the supply of water from their main source was very regular (see Annex 1, Table A.3). So for about 75% of the households, water supply from the main source was at best "most of the time" or at worst "now and then". The situation is worse in Sofia than in Shauri Yako. Two-thirds of the respondents reported that their main water source provided water only now and then compared to 16% in Shauri Yako with the same experience.

Given the unreliability of the households' main water sources, *other* water sources are (at least) as important for their water supply as the main water source. The figures in Table 3 reveal first of all that almost all households collect rain water from their roofs ("roof catchment / rain water"). However, it is obvious that this can only be done when there is rain, i.e. during the rainy season.[36] This means that during the dry season, people have to look for other sources. In Sofia, the most important other source after roof catchment are the private water vendors (49%). Most of the vendors get their water from water kiosks near the

[36] In 'normal' years, the municipality experiences two rainy seasons, the long and the short rains, which fall between February and March and between August and November, respectively (UN-Habitat 2010b).

municipal stadium and distribute it to their customers using hand carts or bicycles (Photo 5). The longer the distance from the water source, the higher the price the customers have to pay.

Photo 5 A vendor with water from a private kiosk further away passes near a non-operational LVWATSAN water kiosk in Sofia (2011)

Since Shauri Yako is located in the 'lower' part of Homa Bay, i.e. relatively close to Lake Victoria, lake water is the second most important other water source in that area (40%). Not all of Shauri Yako is that close to the lake, however, so some households reverted to private water vendors (16%), as many of the Sofia households did. Surprisingly, 20% of the respondents in Sofia also mentioned water from Lake Victoria as one of their other water sources. Since the distance from Sofia to the lake is quite big, this can be seen as yet another indication of the problematic water situation in this area. In the same vein one should regard the households in Sofia who (partly) relied on river water (12%; part of the category "other" in Table 3), given the very bad quality of that type of water.

Seasonality of water consumption

Because of the irregularity of the SNWASCO water provision and the lack of water connections in the low-income areas, water consumption in Homa Bay has strong seasonal components. During the rainy season, most households are able to easily and cheaply cope with the irregularity in piped water system by means of roof catchment. Outside the rainy season, there is a serious shortage of easily accessible (and relatively clean) water. This has consequences for, amongst others, the time needed to fetch water, the cost of water and the amounts of water used in the household. Table 4 provides an overview of these factors.[37]

[37] Details are presented in Tables A.4, A.5 and A.7 in Annex 1.

Fetching of water is mainly a female task (Photo 6). In the large majority of the households in Sofia and Shauri Yako, it was the female head or the female spouse or a female child who was normally responsible to fetch water (see Annex 1, Table A.4). In quite a number of households, fetching water was a shared responsibility of (at least) two persons;[38] again mostly women, although male children and sometimes the male head were also mentioned. Women and young girls carry a double burden of disadvantage, since they are the ones who sacrifice their time and their education to fetch water (UNDP 2006).

Photo 6 Women fetching water from a private kiosk in Shauri Yako (2011)

The respondents were asked how much time was spent on fetching water from their *main* water source[39] in the wet and in the dry season. On average, slightly more than one quarter of an hour per day was spent to fetch water in the *wet* season; a figure that was about the same in the two areas (Table 4). This is not a lot of time, which can be explained by the fact that for most households who had no on-plot water source, their main water source was the on-plot water source of a neighbour. Things are different, however, in the *dry* season when people have no rainwater to harvest and have to rely on alternative sources instead, often located further away. This can be seen in the more than doubling of the time needed to fetch water (Table 4). This was most outspoken in Sofia, where 70% of the households spent at least half an hour per day to fetch water (see Annex 1, Table A.4). It needs no explanation that the households in Sofia using water from Lake Victoria (20%) spent (much) more than an hour to do so.

[38] This can be seen by adding up the percentages in Table A.4 (Annex 1).

[39] Hence, the households with their main water source "on-plot" are excluded here. "Time to fetch water" includes walking to and fro as well as waiting/queuing at the source ('full cycle').

Table 4 Characteristics of water consumption by area and by season[1]

	TOTAL (N=231)	Sofia (N=97)	Shauri Yako (N=134)
Wet season			
Time taken to fetch water (average, minutes/day)[2]	16.9	17.1	16.8
Cost of water (average, Ksh/day)	23.7	30.8	17.9
Water used (average, litres/day):			
- for drinking	6.2	6.6	5.9
- for cooking	14.4	14.3	14.5
- for washing/cleaning	67.7	60.7	72.7
Total	102.4	94.8	107.9
Idem, per household member[3]	22.3	20.0	24.0
Dry season			
Time taken to fetch water (average, minutes/day)[2]	37.0	40.2	34.5
Cost of water (average, Ksh/day)	49.9	66.1	37.2
Water used (average, litres/day):			
- for drinking	7.9	8.5	7.4
- for cooking	14.2	13.8	14.5
- for washing/cleaning	57.7	51.2	62.4
Total	92.4	83.2	99.1
Idem, per household member[3]	20.1	17.3	22.0

Notes:
[1] Averages are calculated using class middles.
[2] Concerns the *main* water source, hence households with "main water source on-plot" are excluded; Ns are 166, 73 and 93, respectively.
[3] Total divided by average household size (from Table 2).
Source: Tables A.4, A.5 and A.7 (Annex 1).

As for the *cost of water*, it is the same story as for fetching water: on the whole, costs were more than twice as high during the dry season in comparison with the wet season (Table 4). Again, this is (much) more outspoken in Sofia. During the wet season, people paid already more than 70% more on water than in Shauri Yako, a difference that was even higher in the dry season. The cost difference between the dry and the wet season can be explained by at least two factors. First, people with their own on-plot water source who sell water to neighbours not only sell more water in the dry season, they also charge them more.[40] Second, private water vendors do more business in the dry season and can (and do) make more profit from the scarcity of water. In general, people who bought water from private vendors paid three times as much as people who bought from neighbours or from public standpipes and kiosks.[41]

Since most of the water is not clean and hence unfit for drinking and cooking, people also have to treat it. The overwhelming majority (93%) of the households treated their water before using it (see Annex 1, Table A.6). The most common way to do that was to add

[40] Based on 14 cases of people selling water to neighbours, we could estimate that they sold about twice as much water to their neighbours in the dry season compared to the wet season (on average 164 and 80 jerry cans per day, respectively) and charged them about 40% more (on average 4.1 and 2.9 shilling per jerry can, respectively).
[41] According to the respondents, these prices were Ksh 13.1 (N=79), Ksh 4.4 (N=81) and Ksh 4.0 (N=60), respectively.

chemicals[42] (95%) or by means of filtering (31%) or boiling (11%). Buying of chemicals and/or wood or charcoal for boiling involves extra costs on top of the costs for the water itself. On average, the households paid about Ksh 34 per month on treatment costs. However, the households in Sofia spent almost 50% more on treatment costs than the households in Shauri Yako, indicating that the quality of the water in Sofia was worse than in Shauri Yako.

The *use of water* is divided into water for drinking, water for cooking and water for washing and cleaning. The figures in Table 4 show some interesting patterns. First, on the whole, total water consumption in the dry season was about 10% lower than in the wet season (92.4 and 102.4 litres per day per household, respectively). Second, while overall water consumption was lower in the dry season, this did not apply to water for cooking, while water consumption for drinking was actually higher in the dry season (for obvious reasons). Third, the reduction in water consumption was stronger in Sofia (-12%) than in Shauri Yako (-8%). Fourth, in the *wet* season, total water consumption per household per day in Sofia was about 12% (or 13 litres) lower than in Shauri Yako. Per household member, it was 17% less. In the *dry* season, these differences were even bigger (16% and 21%, respectively). These differences were solely due to substantially saving on the use of water for washing/cleaning in Sofia.

According to UNDP (2006: 3), "all citizens should have access to resources sufficient to meet their basic needs and live a dignified life. Clean water is part of the social minimum, with 20 litres per person each day as the minimum threshold requirement." Hence, on average, water consumption per person in the two areas and seasons was 'just' enough to meet their daily basic requirements for drinking, cooking and cleaning – except for Sofia in the dry season. However, since these figures are averages and since this minimum may vary depending on a number of factors,[43] it is not surprising that for only about half of the households the total daily water consumption was *always* enough for their daily needs during the *wet* season and that this applied to only 1 out of 10 households during the dry season (see Annex 1, Table A.7). Furthermore, the daily consumption of *drinking* water was much less than the recommended 2-4 litres per person: 1.3 litres and 1.7 litres during the wet and dry season, respectively (Ibid.).

Water consumption characteristics by type of water source

The present section compares the various types of water sources for a number of water consumption characteristics: distance to water source, use of water, treatment of water and problems with water. In Table 3, six categories of water sources were distinguished, but because of the variety of and the small number of cases in the category "other", discussion in this section is limited to the other five categories: piped water on-plot, piped water off-plot, private water vendors, roof catchment and surface (= lake) water. The accompanying figures are presented in Table A.8 (Annex 1).[44]

Distance to water source varied greatly by type of source. By definition, piped water on-plot and roof catchment are water sources near (or even in) the house. The same applies to

[42] The local brands of chemicals commonly used include 'Waterguard', 'Aquatab' and 'PUR'. They are available in small sachets or bottles with a price targeting the poor.

[43] The UN suggests that each person needs 20-50 litres of water a day to ensure their basic daily requirements for drinking, cooking and cleaning and that daily drinking water requirement per person is 2-4 litres (see http://www.unwater.org/statistics_san.html).

[44] For the sake of completeness, Table A.8 also contains the figures for "other water sources".

water from private vendors who bring the water from door to door. As for piped water off-plot, for the majority of the households this concerned piped water from a neighbour at a short distance. Households who fetched water from a public standpipe or a water kiosk had to spend more time on fetching water, some more than half an hour. The largest distances had to be covered by those who fetched water from Lake Victoria. This applied especially to those households in Sofia who used the lake as an additional source of water.

As for the *use of the water* from the different sources, practically all households with access to piped water – be it on-plot or off-plot –used it for drinking and cooking and slightly less for washing/cleaning. This applied to almost the same extent to water obtained by roof catchment. Water from private water vendors was primarily used for cooking and washing/cleaning and much less (57%) for drinking. As will be seen later, rainwater is generally considered safer than water from private water vendors. On the other hand, lake water was mostly used for washing/cleaning, though in quite many households (65%) it was also used for cooking, while some (14%) even used it for drinking. Related to this is the *treatment of water*. Although in general, treatment of water was very common, it was more so in case the water was used for drinking and/or cooking. This explains that about one-quarter of the households using lake water did *not* treat it, despite the unhealthy nature of this type of water, the reason being that this water was mostly used for washing and cleaning. As for the *mode of treatment*, there were no differences between the five types of water sources in this respect.

For each type of water source, the respondents were asked whether they faced any *problems with water* during the wet season and during the dry season. Eight types of problems were distinguished: unreliable, interrupted, insufficient, poor quality, source too far, price (too) high, irregular billing and corruption. In general, the percentage of households facing problems was much higher in the dry season than in the wet season. Nevertheless, even in the *wet season*, when water is supposed to be relatively abundant, quite a number of respondents with access to piped water[45] complained about unreliability, interruptions and (therefore) insufficient supply and poor quality of the water. The same complaints, though to a slightly lesser extent, were heard regarding rain water collected by means of roof catchment. Compared to the wet season, the percentages of households facing problems in the *dry* season multiplied in all respects.

It is worthwhile to look into the problems for some of the water sources into more detail, to begin with households with a private water connection ("piped water on-plot") in their compound or house. It is conspicuous that during the dry season, the percentage of households faced with such problems as unreliability, interruptions and insufficient supply as well as poor quality was almost as high as for the other water sources. In addition, many households with a private connection complained about irregular billing and corruption, throughout the year.[46]

Private water vendors are generally known as the most expensive source of water. Indeed, many people using this type of water complained about the (too) high prices they had to pay, not only during the wet season (38%) but very much so during the dry season (96%).

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[45] This percentage includes many households getting water from private water vendors because the latter usually obtain their water from water kiosks (see Photo 7).

[46] These were largely service provision related cases such as poor services, slow response to complaints, not trusting or understanding the billing system, and the perception that some areas were receiving more water than others during rationing.

Moreover, households relying on private water vendors were just as much – if not more – faced with an unreliable, interrupted and insufficient water supply as people with access to piped water.

Photo 7 A water vendor gets water from a private water kiosk in Sofia (2011)

The nearness of Lake Victoria may at first sight seem a safe escape to water when water from other sources is scarce. Yet, this is so only to some extent. The reason is that it is not very easy to fetch water from the lake. Safety, deepness of the area, as well as where one can draw 'clean' water are important considerations. The lake shore is characterised by dense vegetation of e.g. papyrus, through which small paths lead to the water. Getting water from the lake during the dry season is quite difficult because the lake recedes, the paths to the lake are muddy and the water becomes dirtier; hence the surprisingly high percentages of respondents (25 to 35%) claiming that during the dry season lake water is unreliable, interrupted and insufficient.

In the questionnaire, a distinction was made between *problems* and *serious problems*. Table 5 presents the percentages of households facing *serious problems* with the various types of water sources.[47] It is immediately clear that in the *wet* season, most of the respondents felt that although problems were there, they were mostly not classified as 'serious'. The situation regarding the *dry* season was completely different, however: not only were the percentages of households facing problems with their water situation much higher than in the wet season,[48] these problems were also perceived as 'serious' by most respondents. The only exception in this regard was the problem of "source too far", which was not seen as a *serious* problem by about half of those mentioning this. Table 5 also shows

[47] Both "problems" and "serious problems" are shown in Table A.9 (Annex 1).
[48] This can be seen in the column "all water sources" in Table A.8 (Annex 1).

that the seriousness of problems with the households' water situation was stronger felt in Sofia than in Shauri Yako, and this applied to all eight categories of problems.[49]

Table 5 Serious problems with household water situation by area and by season (% yes)

	TOTAL (N=625[1])		Sofia (N=287[1])		Shauri Yako (N=338[1])	
	wet season	dry season	wet season	dry season	wet season	dry season
unreliable	4.8	55.5	7.0	65.2	3.0	47.3
interrupted	4.0	43.0	6.6	48.8	1.8	38.2
insufficient	2.7	53.3	4.5	60.6	1.2	47.0
poor quality	11.4	44.6	9.1	47.7	13.3	42.0
source too far[2]	7.2	19.1	7.7	24.2	6.7	15.1
price (too) high[3]	7.0	57.9	9.1	68.3	4.8	47.6
irregular billing[4]	18.6	48.8	30.8	53.8	13.3	46.7
corruption[4]	11.6	37.2	15.4	69.2	10.0	23.3

Note:
[1] Ns concern water sources.
[2] Excluding households with on-plot water source and private water vendors (N=446/194/252).
[3] Excluding roof catchment and surface (lake, river) water (N=330/164/166).
[4] Only households with individual (on-plot) connection (N=43/13/30).
Source: Table A.9 (Annex 1).

Coping with water scarcity

Due to the above-described problems, many of the households (73%) in the two settlements claimed to have experienced one or more periods of water scarcity. This was more common in Sofia (93%) than in Shauri Yako (59%). The respondents were asked whether situations of water scarcity had an impact on the fetching of water, the cost of water and the domestic water consumption. Not surprisingly, the figures in Table 6 show that for all three challenges the percentages are about the same as the percentages of households who had experienced water scarcity. Only regarding the cost of water, some respondents – in both areas – said that scarcity had had no impact on the cost of water because they paid a fixed price throughout the year.

Table 6 Challenges due to water scarcity by area (%)

Type of problem	TOTAL (N=231)	Sofia (N=97)	Shauri Yako (N=134)
Fetching of water	72.7	91.8	59.0
Cost of water	65.4	84.5	51.5
Domestic water consumption	72.3	90.7	59.0

Source: Fieldwork 2010.

As for fetching of water, the most frequently mentioned challenge was the longer distance to the available water points (54%[50]). While the common remark was that "I spent more time

[49] The very high percentage of respondents (69%) in Sofia for whom "corruption" was a *serious* problem in the dry season is conspicuously, but may be caused by the small number of cases (13).

to look for water", some respondents were a bit more specific. For instance, one respondent in Sofia remarked that "I wasted a lot of time going to the river", while another one said that "the distance to the lake was long and time-consuming". Apparently, during periods of water scarcity, there is a scarcity of water vendors as well. Finding a private water vendor could be quite time-consuming, resulting in such remarks as "even the water vendors were hard to find due to a high demand for them" and "wasted a lot of time to look for water vendors".

Queuing at the available water points was the second-most mentioned challenge related to the fetching of water (29%), either or not in combination with the longer distances. Some people solved this problem by waking up very early (when still dark) or even at night to avoid the waiting time. One Sofia respondent remarked: "I woke up early to be among the first ones on the queue". Another strategy was "going later when people have reduced". The scarcity of water vendors was mentioned by 12 respondents (7%), although quite many households (22%) coped with the fetching challenge by buying water from water vendors. One respondent "negotiated with a vendor to bring water at home every day", a strategy that was mentioned by several others as well. Storing of water was another coping strategy, by filling all the containers (jerry cans) one had and/or buying some extra ones. One respondent in Sofia "bought a bicycle to help in fetching water" from the lake. A few respondents who could afford it hired someone to fetch the water.

The scarcer the water, the more it costs. Many respondents were faced with this economic law. The most frequently mentioned way to cope with this challenge was to reduce the use of water (34%) or to "squeeze my budget" (29%), which in essence is about the same type of coping mechanism. This affected first of all the amount of water available for washing and cleaning because it is very difficult to save on water for drinking and/or cooking. Yet, some respondents (4%) indicated that they had no clean water for cooking and drinking, while a few (2%) said they were forced to use dirty, unhealthy water for these purposes. This is likely to be lake water, at least by this remark: "I fetched water from the lake to minimise costs", a strategy that was mentioned by 16% of the respondents. "Setting aside some money to be able to buy water" was also mentioned by some respondents. In other instances, money was not saved on water but on other household expenditures, while only buying water for drinking instead of buying for other purposes as well was also mentioned by some.

Given these challenges, it is not surprising that almost half of the households indicated not to have sufficient water during periods of water scarcity. As said, reducing the amount of water used for washing and/or cleaning was an often mentioned coping strategy (20%). In practice, this meant bathing and/or washing clothes less regularly or washing clothes at the lake or at a river. As one respondent in Sofia remarked, "washing was done on weekends and not daily as it was earlier". Besides reducing the amount of water used, reusing or recycling of water was also practised (18%). For instance, some respondents indicated that they used recycled water for mopping.

Water and income-generating activities

During the survey, 368 income-generating activities were recorded among the 231 households, which is an average of 1.6 activities per household (Table 7). This was the same in the two areas (despite the higher household welfare index in Sofia). More than a quarter of these activities required water. This percentage was somewhat higher in Shauri Yako, which

[50] Percentages here refer to the number of households faced with the specific challenges.

had more household members engaged in hotel businesses and in fish-related activities than in Sofia. The fish-related activities mainly concern the selling of fresh and fried fish in the market or along the roads. Women buy fish from the fishermen at the lake shore and sell them fresh or fry them. In addition, there are women who are involved in selling fish waste from the fish-processing plant (Photo 8). They buy the fish waste,[51] commonly known as *mgongo wazi*[52], from the fish-processing plant, wash the 'fish', dry, smoke or fry it and then sell it to local consumers. *Mgongo wazi* is an important part of the diet for many poor households who may not afford to buy a whole tilapia or meat for protein.

Table 7 Income-generating activities and water, by area[1]

	TOTAL (N=368)	Sofia (N=158)	Shauri Yako (N=210)
Average number of income-generating activities per household	1.6	1.6	1.6
Percentage of income-generating activities requiring water	27.7	24.1	30.5
Main types of activities[2] requiring water (%)	(N=102)	(N=38)	(N=64)
hotel business[3]	25.7	13.2	33.3
cleaning	16.8	26.3	11.1
fish-related	14.9	7.9	19.0
irrigation of crops	9.9	13.2	7.9
washing crops for selling	8.9	10.5	7.9
construction	7.9	10.5	6.3
hair salon	5.0	10.5	1.6
Percentage of income-generating activities with negative impact of water scarcity	48.5	44.1	50.8

Notes:
[1] Ns concern income-generating activities.
[2] 'Main': activities performed by at least 10% in either area. For all types of activities requiring water, see Table A.10 in Annex 1.
[3] These are small eating outlets common in many small and medium-size towns. They sell affordable tea, snacks and freshly cooked local food, mainly to travellers passing through the town and to people from the surrounding rural areas coming to town for services. These outlets are numerous in number and can be both formal (in a good building, with employees) and informal (family business, in a kiosk or makeshift shed).
Source: Table A.10 (Annex 1).

As for the other types of income-generating activities requiring water, the need of water is quite obvious (see Table 7). Some women were involved in cleaning, which cannot be done without water. A number of households practised crop cultivation and/or livestock keeping, so water was needed to irrigate the crops and/or to let the animals drink (see below). Other women were involved in (buying and) selling food crops, which had to be washed before being able to offer them for sale. Some men had a construction business, so water was for instance needed for making cement. A few women had a hair salon, requiring water for hair washing. Finally, four persons prepared food (*mandazi* and/or *chapati*[53]), three kept tenants in

[51] This is the head and skeleton or frame of what is left after the fillets of the fish has been removed in the factory.
[52] Swahili for 'bare back'.
[53] *Mandazi* is a donut while *chapatti* is a flat bread. They are common in East Africa.

the house who needed water, another three sold water, while one person brewed and sold a local brew called *chang'aa*[54] (see Table A.10, Annex 1).

Photo 8 Traders with *mgongo wazi* from the fish-processing factory (2008)

Despite these water requirements, about half of the respondents indicated that scarcity of water had little or no impact on these activities. This was largely because many of these activities do not require large amounts of water. The other half (Table 7) were affected in one way or another depending on the type of activity. For example, hotel businesses risked temporary closure, hair salons could not provide services that required a lot of water, crop cultivators realised low or poor yields, and vegetable and fish sellers lost customers due to poor hygienic conditions. For some, more time was spent in looking for water, while others lost their daily wages. The only person saying that his business thrived better in times of water scarcity was a water vendor, benefitting from the higher prices.

In almost half of the households, at least one of the household members – mainly women – was member of a group.[55] The average number of group memberships in these households was 1.1. The majority of these groups' activities concerned merry-go-rounds, social welfare activities and savings and credit. However, some groups were involved in income-generating activities, such as hiring out tents and/or chairs (7 cases), farming and/or poultry keeping (5), buying and selling of vegetables (1) and making bricks (1). These were the activities requiring water and were obviously also the ones with a negative impact of water scarcity.

[54] *Chang'aa* is an illegal alcohol that is traditionally brewed in many parts of Kenya. The brew can be made from a variety of grains, malted maize and millet being the most common. *Chang'aa* brewing, selling and drinking is common amongst the urban poor, and can sometimes be a very profitable business.

[55] For figures with this paragraph on group memberships, activities and water, see Table A.11 (Annex 1).

Urban crop cultivation was practised by more than one quarter of the surveyed households.[56] This is a much higher percentage than recorded under the heading "income-generating activities", but that does not mean that for most crop-cultivating households it does actually provide at least some income, be it directly (by selling crops) or indirectly (by spending less money on buying food crops). The reason(s) that respondents may not have mentioned it as an income-generating activity could be that the crops were primarily cultivated as a source of food and/or that female respondents did not want to reveal in the presence of their husbands that they actually sold part of the crop.[57]

On an average plot size of about one acre, a variety of crops were cultivated, be it that maize was dominant, followed by beans and vegetables. According to the respondents, in most cases the crops were only grown for own consumption (especially in Sofia), though selling of crops was also quite common. In terms of water, most crop cultivators relied solely on rain; only 30% said to irrigate their crops. This water was mostly taken from the tap. Three households in Shauri Yako used lake water, while one crop cultivator in Sofia even bought water from a water vendor for this purpose. It is not surprising that almost all of those who irrigated their crops said that scarcity of water had a negative impact. As one respondent stated, "my tomatoes started to wither". "The crops died," said another, while "lower yields" was also mentioned a few times. Some tried to cope with this problem by using "little amounts of water", by using river or lake water, by using recycled water or by practising drip irrigation. Three respondents told that they "reduced land under cultivation" and/or "used sewer water". A few opted for early-maturing and/or drought-resistant crops such as cassava. Others simply stated that they "could not help it", so "crops were left to survive on their own" or they even "stopped crop cultivation" completely.

Almost 30% of the households in the study areas could be classified as urban livestock keepers.[58] The activity was more common in Sofia than in Shauri Yako because of the high percentage of Sofia households keeping chickens. Cows and goats were also commonly kept. In most cases, the animals were kept in free grazing, i.e. roaming around in the street. The large majority of the livestock-keeping households consumed all or part of the animals' products: meat, eggs or milk. Yet, about two-thirds of them (also) sold animal products.

In most cases (80%), the animals' drinking water was piped water. In some cases, other water sources were used, such as rain water, the lake, a river, water vendors or a borehole. More than half of the livestock keepers experienced no negative effects of water scarcity. These were mainly the ones who kept chickens: water scarcity is "not a problem for the chickens", several respondents stated. Yet, according to about one-fifth of the livestock keepers, water scarcity was "bad for the animals' health", while for others it meant that "it takes more time to find water" for the animals.

Water and health

Access to safe water as well as decent sanitation provisions have a major impact on the health situation of the people. The respondents appeared to be very aware of that.[59] Asked which water- and sanitation-related diseases were common in the area, the large majority mentioned cholera, typhoid and dysentery. One-quarter of the respondents reported that at least one

[56] For figures with this and the following paragraph on urban crop cultivation, see Table A.12 (Annex 1).
[57] This was demonstrated by Simiyu (2012) in his study on gender aspects of urban farming in Eldoret, Kenya.
[58] For figures with this and the following paragraph on urban livestock keeping, see Table A.13 (Annex 1).
[59] For figures with this paragraph, see Table A.14 (Annex 1).

member of the household had suffered from one of these diseases during the four months preceding the survey. This percentage was higher in Shauri Yako (30%) than in Sofia (21%), despite the fact that access to relatively safe water in Shauri Yako – at least, measured in the percentage of households with access to piped water – was somewhat better than in Sofia (see Table 3). By far the most common disease that people suffered from was typhoid: 80% in Sofia and 73% in Shauri Yako. The incidences of cholera and dysentery were not many. These are all serious diseases requiring treatment. Practically all patients went to hospital, which involved costs to be made. Although these costs varied, the average costs were almost Ksh. 1,400. The average cost was higher in Shauri Yako (Ksh. 1,633) than in Sofia (Ksh. 844). This may not seem a lot of money, but for a low-income household in Homa Bay it is. This implies that households with a monthly income of Ksh. 5,000 or less spend, on average, no less than 28% of their income on treatment.[60] In 18% of the illness cases, the costs were more than Ksh. 2,000 and in three cases even more than Ksh. 5,000. Such amounts (but also less) can have a serious impact on the household: money to spend on treatment cannot be spent otherwise, children miss school, while adults miss work, resulting in less income.

Bad sanitation facilities may also cause diseases. Very few people had a sanitation facility inside their houses.[61] Over 90% of the households in the two areas made use of a pit latrine. Almost two-thirds of these had access to an improved type of pit latrine.[62] In about 150 cases, both the pit latrine and the household's main water source were within the compound. In three-quarters of the cases the distance between the two facilities was 10 metres or less. Since it is recommended that a pit latrine is located at a minimum distance of 15 metres from a (ground) drinking water source to limit exposure to contamination (Kimani-Murage & Ngindu 2007), this situation is a potential health risk.

Three-quarters of the surveyed households shared their sanitation facility with other households. On average, sharing was done with almost six other households. Given an average household size of 4.6 people (Table 2), this implies that on average one facility was used by some 30 persons. This average was higher in Shauri Yako (6.3 other households) than in Sofia (4.8). This might be an explanation for the higher incidence of water- and sanitation-related diseases in Shauri Yako.

Perceptions on the safety of water

The respondents in the surveyed areas were very well aware of the risks of unsafe water: all of them indicated that one gets ill from drinking unsafe water. An important question then is: how do people perceive the safeness of the various water sources for drinking? Table 8 provides an assessment of the safety of six types of water sources for drinking, based on the perceptions of the respondents. The table reveals some conspicuous findings. First, piped water was *not* perceived as the safest water source. Instead, rain water (roof catchment) was considered slightly safer. Over three-quarters of the respondents considered rain water as safe or even very safe for drinking (see Annex 1, Table A.16). Second, water from shallow wells and surface water (the lake and/or river water) were seen as the *least* safe sources of drinking water (which is of course not surprising). Third, water supplied by private water vendors was

[60] One third of the households (32.6%) had a monthly income of not more than Ksh. 5,000.

[61] For figures with this paragraph, see Table A.15 (Annex 1).

[62] Improved pit latrines offer improved sanitation by eliminating flies and smell through ventilation. The (installed) ventilation pipe allows odours to escape and minimizes the attraction for flies. Traditional pit latrines are the simplest type of a pit latrine and do not have ventilation.

perceived as only slightly less unsafe than for instance water from Lake Victoria. About 55 to 60% of the respondents considered water from private vendors as unsafe. Apparently, people knew – or suspected – that water vendors obtained their water from other (i.e. unsafe) sources than piped water. Finally, water from boreholes was mostly seen as fairly safe to unsafe. However, for very few households boreholes (like shallow wells) were a source of water.

Table 8 Assessment of the safety of water for drinking, by type of water source and by area*

Type of water source	TOTAL (N=231)	Sofia (N=97)	Shauri Yako (N=134)
Piped water	2.7	2.5	2.8
Borehole water	1.8	1.8	1.8
Shallow wells	1.2	1.3	1.2
Water from private vendors	1.5	1.5	1.4
Rain water / roof catchment	2.9	2.9	2.8
Surface water (lake, river)	1.1	1.2	1.1

* Calculated from the data presented in Table A.16 (Annex 1) and based on the following scores: very safe = 4, safe = 3, fairly safe = 2 and unsafe = 1. The closer the values in the table are to 4, the safer it was assessed by the respondents; and the closer to 1, the more it was assessed as unsafe. The Ns on which the scores are based differ because the "don't knows" (piped water: 0; borehole water: 24; shallow wells: 21; water vendors: 10; rain water: 0; surface water: 8) have been left out.

Source: Table A.16 (Annex 1).

Given these negative assessments, it is not surprising that many respondents (75%) indicated that they would be willing to pay more for safe(r) water (which stills leaves one-quarter who would *not* be willing to pay more). This implies improvements in the water supply. Asked in what way(s) the provision of water in Homa Bay could/should be improved, about half of the respondents said that "access to safe, regular and reliable piped water" should be improved and/or facilitated. This clearly indicates that water should not only be safe, its provision should also be regular and reliable. About one-third of the respondents were of the opinion that "water has to be treated properly". According to another third, "water governance by SNWASCO has to be improved", whereby a whole range of issues was mentioned: delivery, connections, distribution, pricing, provision of information, pumping, the capacity of storage tanks, repair of pipes, replacement of old pipes, policing, corruption, billing, and reading of metres, among others.

Several other ways for improvements were mentioned, be it by relatively few respondents only. For instance, according to 12 respondents, "landlords should provide piped water for their tenants". Eleven respondents pleaded for the "provision of affordable water to the urban poor to discourage the use of untreated water" (i.e. lake and river water) – which is exactly what LVWATSAN is all about. "Sensitization and training of residents on water-related aspects" was mentioned by ten respondents, pointing at such issues as taking care of water pipes, rainwater harvesting, protection of water sources, working together and handling of water. According to another ten respondents, "proper waste and sewer disposal management" was needed – at both household and town level – to avoid polluting the lake (and thus making lake water safer for human use). Seven respondents came with the idea to dig boreholes (which are very few in the two settlements) "to be used during water scarcity periods". And

finally, another idea was put forward by two respondents, namely “to supply poor urban households with storage tanks to harvest rainwater”.

5. Conclusions

On 28 July 2010, the UN General Assembly recognized that safe and clean drinking water and sanitation are human rights, essential to the full enjoyment of life and all other human rights (UNICEF/WHO 2012). In Kenya, every citizen has a right to water. The national water resources management strategy commits to ensuring that all people are covered by formal water supply system and that poor Kenyans pay tariffs that they can afford (Kenya 2006a). Considerable progress has been made in facilitating access to water since the enactment of the Water Act 2002. Water service providers, including SNWASCO in Homa Bay, are working towards their ‘mission’ to efficiently provide safe, adequate, reliable, affordable and sustainable water, sanitation and allied services to their customers – certainly with mixed levels of successes and challenges. In Homa Bay, SNWASCO’s efforts are being complemented by the LVWATSAN programme interventions.

There is no doubt that, in general, water services in Homa Bay have improved with the implementation of the LVWATSAN programme. Rehabilitation of the water intake points, water treatment works and installation of new pumps has increased the daily water production. New and activated (dormant) connections imply that additional people are now served with water. Metering and capacity building has improved SNWASCO’s revenue collection and overall efficiency. Together with other rehabilitation works, metering has also significantly reduced the unaccounted-for-water. The role of MSF-Homa Bay has increased stakeholder and community participation, as well as injecting transparency and accountability in service delivery by the Municipal Council of Homa Bay and SNWASCO. In addition, there are a number of improvements in connection to the programme’s sanitation and solid waste management interventions.

Despite these positive impacts at the municipality level, results of the survey in 2010 reveals that a lot remains to be achieved, especially in the low-income settlements. The daily water production and supply of 3,000 m^3 is still far below the estimated demand of about 18,000 m^3 per day. The water supply situation becomes worse with the unpredictable water rationing that can take up to three days in Sofia and Shauri Yako. For a number of households, the ‘normal’ daily water supply hours are short, irregular and unreliable. As such, residents in the two areas rely on *other* water sources – besides their *main* source.

While the large majority of households in Sofia and Shauri Yako have access to an improved water source (i.e. piped water), about half of them have to fetch the piped water from some distance outside the compound, either from a neighbour or a water kiosk. The proportion of households with individual connections is still low. Off-plot water sources consume a considerable amount of time. Furthermore, a significant number of households still rely on *un*improved water sources such as water vendors, rain water, shallow wells, rivers and water from the lake – be it as their main or alternative source of water.

Because of the irregularity of the SNWASCO water provision and the lack of water connections in the low-income areas, water consumption in the two areas has strong seasonal components. While the situation is relatively better during the *wet* season due to reliance on rain water, there is a serious shortage of easily accessible and clean water during the *dry* season: the piped water is more unreliable, insufficient and interrupted; households spend

more time and long distances looking for water; they rely more on unsafe water; are forced to survive with the little water available; and pay more in purchasing and treating water. Furthermore, as women and the girl-child shoulder the burden of fetching water, inadequate access to water has a major gender dimension in Homa Bay.

Support to water supply development can help to achieve sustainable livelihoods within poor communities, and in so doing make a real contribution to poverty reduction. A number of households in Sofia and Shauri Yako engaged in income-generating activities that relied on adequate supply of clean water. Water scarcity had a negative impact, directly or indirectly, on some of these activities and the livelihood of those involved. The use of unsafe water and poor sanitation may also result in high incidences of typhoid, cholera and dysentery as experienced in a number of households.

The LVWATSAN programme interventions in Homa Bay is indeed very timely and will go a long way in improving the access to water situation in the municipality. However, from the implementation history of the programme it is also clear that the obstacles to realise the programme's objectives are immense, particularly where it concerns the land issue and, related to this, 'politics'. As long as all the LVWATSAN water kiosks in the low-income settlements are not (yet) fully functional and have a regular supply of water, the programme's main objective – to provide all residents in Homa Bay with clean and affordable water – shall not be realised. It is the mandate of the local community to manage the water kiosks (through MSF-Homa Bay) and SNWASCO, as a service provider, to make sure that the kiosks have an adequate and reliable water supply.

Annex 1: Tables

Table A.1 Household characteristics by area

	TOTAL (N=231)	Sofia (N=97)	Shauri Yako (N=134)
Tenure status (%)			
own house	26.0	29.9	23.1
rented	74.0	70.1	76.9
Total	100	100	100
Household possessions (% yes)			
electricity	40.7	46.4	36.6
cell phone	90.0	88.7	91.0
radio	91.3	94.8	88.8
TV	56.7	64.9	50.7
gas cooker	30.7	40.2	23.9
fridge	13.4	19.6	9.0
bicycle	31.2	27.8	33.6
motorbike	10.8	12.4	9.7
Household welfare index (HWI)[1] *(%)*			
1 – "very low" (0-5 points)	28.1	21.6	32.8
2 – "low" (6-12 points)	30.3	36.1	26.1
3 – "medium" (13-20 points)	20.8	14.4	25.4
4 – "high" (21-50 points)	20.8	27.8	15.7
Total	100	100	100
Average[2] *HWI*	*14.2*	*16.1*	*12.9*
Household size (%)			
1-3	25.5	25.8	25.4
4-6	61.9	55.7	66.4
7+	12.6	18.6	8.2
Total	100	100	100
Average household size (members)	*4.6*	*4.8*	*4.5*

Notes:

1) Based on the relative cost of 7 household possessions if bought new from the market or shop. The cheapest item (radio) was given 1 point and the dearest (motorbike) 16 points, meaning that a motorbike was about 16 times more expensive than a radio. The points for the other five items were as follows: cell phone 2, gas cooker 3, TV 6, bicycle 10 and fridge 12. The (theoretical) minimum score was 0 and the maximum 50.
2) Averages are calculated using class middles.

Source: Survey 2010

Table A.2 Characteristics of household heads by area (%)

	TOTAL (N=231)	Sofia (N=97)	Shauri Yako (N=134)
Sex			
male	81.8	84.5	79.9
female	18.2	15.5	20.1
Total	100	100	100
Age			
<30	28.6	23.7	32.1
30-39	30.7	32.0	29.9
40-49	22.9	22.7	23.1
50-59	11.3	11.3	11.2
60+	6.5	10.3	3.7
Total	100	100	100
Average[1] age (years)	*38.6*	*40.3*	*37.5*
Marital status			
never married	5.6	2.1	8.2
married	80.5	84.5	77.6
divorced/widowed/separated	13.9	13.4	14.2
Total	100	100	100
Educational level			
none	1.7	3.1	0.7
primary school (part or whole)	29.9	21.6	35.8
secondary school (part or whole)	39.8	42.3	38.1
more than secondary	27.3	30.9	24.6
dot stated / don't know	1.3	2.1	0.7
Total	100	100	100
Occupational status			
regular employed – formal sector	26.0	40.2	15.7
tempor. employed – formal sector	10.8	7.2	13.4
self-employed	50.6	33.0	63.4
casual labourer/worker	8.2	11.3	6.0
unemployed / looking for job	1.3	2.1	0.7
homemaker	0.9	1.0	0.7
retired	2.2	5.2	0
Total	100	100	100

Note:
1) Averages are calculated using class middles.
Source: Survey 2010

Table A.3 Access to water sources by area (%)

	TOTAL (N=231)	Sofia (N=97)	Shauri Yako (N=134)
Main water source			
piped water – on plot[1]	41.6	34.0	47.0
piped water – off plot[2]	50.6	48.5	52.2
private water vendors	4.3	10.3	0
roof catchment / rain water	2.6	6.2	0
surface water (lake)	0.4	0	0.7
other[3]	0.4	1.0	0
Total	100	100	100
Access to piped water in the house	*18.6*	*13.4*	*22.4*
Other water sources[4]			
piped water – on plot[1]	1.7	2.1	1.5
piped water – off plot[2]	12.6	20.6	6.7
private water vendors	29.4	48.5	15.7
roof catchment / rain water	87.9	87.6	88.1
surface water (lake)	32.0	20.6	39.6
other[3]	6.9	15.5	0.7
Average[4] number of other water sources	*1.7*	*2.0*	*1.5*
All water sources[5]			
piped water – on plot[1]	43.3	36.1	48.5
piped water – off plot[2]	63.2	69.1	59.0
private water vendors	34.2	59.8	15.7
roof catchment / rain water	90.5	93.8	88.1
surface water (lake)	32.0	20.6	40.3
other[3]	7.4	16.5	0.7
Average[4] number of water sources	*2.7*	*3.0*	*2.5*
Regularity of water from main source			
always (very regular)	27.7	14.4	37.3
most of the time (regular to irregular)	35.5	19.6	47.0
now and then (very irregular)	36.8	66.0	15.7
Total	100	100	100
Opinion on quality of water from main source			
good	41.6	47.4	37.3
fair	55.0	45.4	61.9
bad	3.5	7.2	0.7
Total	100	100	100

Notes:
1) Individual, landlord.
2) Neighbour, public standpipe, water kiosk (Council/NGO/private).
3) Borehole, shallow well, river water.
4) Averages are calculated using class middles.
5) Totals add up to more than 100%.

Source: Survey 2010.

Table A.4 Fetching water by area (%)[1]

	TOTAL (N=231)	Sofia (N=97)	Shauri Yako (N=134)
Person normally responsible for fetching water[2]			
female household head	19.3	23.3	16.1
male household head	9.0	5.5	11.8
female spouse	54.2	50.7	57.0
female child	23.5	31.5	17.2
male child	16.3	19.2	14.0
other relative	7.2	5.5	8.6
worker / hired person	7.2	6.8	7.5
Time taken to fetch water – wet season			
up to 5 minutes/day	7.0	10.3	4.4
6-10 minutes/day	32.9	27.9	36.7
11-20 minutes/day	29.7	30.9	28.9
21-30 minutes/day	22.2	22.1	22.2
31-60 minutes/day	7.0	7.4	6.7
more than 60 minutes/day	1.3	1.5	1.1
Total	100	100	100
Average[3] *time (minutes/day)*	*16.9*	*17.1*	*16.8*
Time taken to fetch water – dry season			
up to 5 minutes/day	1.2	1.4	1.1
6-10 minutes/day	4.8	4.1	5.4
11-20 minutes/day	12.7	6.8	17.2
21-30 minutes/day	18.7	17.8	19.4
31-60 minutes/day	56.6	60.3	53.8
more than 60 minutes/day	6.0	9.6	3.2
Total	100	100	100
Average[3] *time (minutes/day)*	*37.0*	*40.2*	*34.5*

Notes:
1) Concerns the 166 households with main water source off-plot.
2) Totals add up to more than 100%.
3) Averages are calculated using class middles.

Source: Survey 2010.

Table A.5 Costs of water by area and by season (%)[1]

	TOTAL (N=231)	Sofia (N=97)	Shauri Yako (N=134)
Cost of water – wet season			
up to 10 Ksh/day	23.5	13.8	31.3
11-20 Ksh/day	39.1	32.5	44.4
21-50 Ksh/day	30.7	42.5	21.2
51-100 Ksh/day	5.6	8.8	3.0
more than 100 Ksh/day	1.1	2.5	0
Total	100	100	100
Average[2] amount (Ksh/day)	*23.7*	*30.8*	*17.9*
Cost of water – dry season			
up to 10 Ksh/day	2.8	1.3	4.0
11-20 Ksh/day	23.3	10.1	33.7
21-50 Ksh/day	39.4	35.4	42.6
51-100 Ksh/day	25.6	36.7	16.8
more than 100 Ksh/day	8.9	16.5	3.0
Total	100	100	100
Average[2] amount (Ksh/day)	*49.9*	*66.1*	*37.2*
	(N=226)[3]	(N=93)[3]	(N=133)[3]
Opinion on cost of water – wet season			
very high	1.3	2.2	0.8
high	42.2	35.9	46.6
fair	36.0	28.3	41.4
low	8.9	18.5	2.3
very low	4.4	10.9	0
don't know	7.1	4.3	9.0
Total	100	100	100
Opinion on cost of water – dry season			
very high	31.9	33.3	30.8
high	46.0	52.7	41.4
fair	15.9	9.7	20.3
low	0	0	0
very low	0	0	0
don't know	6.2	4.3	7.5
Total	100	100	100

Notes:
1) Concerns the 180 households who paid cash for water (i.e. excluding 5 households not paying for water, 45 households paying by monthly bills and 29 households where the costs for water were included in the rent).
2) Averages are calculated using class middles.
3) Concerns the 226 households paying for water.

Source: Survey 2010.

Table A.6 Treatment of water by area (%)

	TOTAL (N=231)	Sofia (N=97)	Shauri Yako (N=134)
Do you treat water?			
yes	93.1	95.9	91.0
no	6.9	4.1	9.0
Total	100	100	100
	(N=215)	(N=93)	(N=122)
Kind of treatment[1]			
use of chemicals[2]	96.7	95.8	97.6
boiling	15.8	19.4	13.1
filtering	31.2	33.4	29.5
solar disinfection	0.5	0	0.8
Costs involved?			
yes	98.6	97.8	99.2
no	1.4	2.2	0.8
Total	100	100	100
Kind of costs	(N=212)	(N=91)	(N=121)
purchase of treatment chemicals	93.4	92.3	94.2
purchase of charcoal/firewood	2.8	3.3	2.5
purchase of both	3.8	4.4	3.3
Total	100	100	100
Costs per month	(N=125)[3]	(N=55)[3]	(N=70)[3]
up to 20 Ksh.	54.4	34.5	70.0
21-50 Ksh.	31.2	43.6	21.4
51-100 Ksh.	11.2	16.4	7.1
more than 100 Ksh.	3.2	5.5	1.4
Total	100	100	100
Average[4] *costs per month (Ksh.)*	*33.8*	*41.3*	*27.9*

Notes:
1) Totals add up to more than 100%.
2) The local brands of chemicals commonly used include Waterguard, Aquatab and PUR.
3) The remaining households mentioned no period.
4) verages are calculated using class middles.

Source: Survey 2010.

Table A.7 Amounts of water used daily by area and by season[1]

	TOTAL (N=231)		Sofia (N=97)		Shauri Yako (N=134)	
	wet season	dry season	wet season	dry season	wet season	dry season
Water for drinking (%)						
up to 3 litres/day	29.0	16.0	26.8	14.4	30.6	17.2
4-6 litres/day	27.7	23.4	23.7	19.6	30.6	26.1
7-10 litres/day	35.5	41.6	39.2	39.2	32.8	43.3
11-15 litres/day	3.9	12.1	6.2	18.6	2.2	7.5
16-20 litres/day	3.9	5.6	4.1	7.2	3.7	4.5
more than 20 litres/day	0	1.3	0	1.0	0	1.5
Total	100	100	100	100	100	100
Average per household (litres/day)	*6.2*	*7.9*	*6.6*	*8.5*	*5.9*	*7.4*
Average per h'hold member (litres/day)	*1.3*	*1.7*	*1.4*	*1.8*	*1.3*	*1.6*
Water for cooking (%)						
up to 5 litres/day	4.3	4.8	4.1	5.2	4.5	4.5
6-10 litres/day	28.6	29.0	28.9	30.9	28.4	27.6
11-20 litres/day	47.6	48.1	48.5	48.5	47.0	47.8
more than 20 litres/day	19.5	18.2	18.6	15.5	20.1	20.1
Total	100	100	100	100	100	100
Average per household (litres/day)	*14.4*	*14.2*	*14.3*	*13.8*	*14.5*	*14.5*
Average per h'hold member (litres/day)	*3.1*	*3.1*	*3.0*	*2.9*	*3.2*	*3.2*
Water for washing/cleaning (%)						
up to 20 litres/day	1.7	7.4	3.1	10.3	0.7	5.2
21-40 litres/day	15.6	21.5	22.7	29.9	10.4	15.7
41-60 litres/day	25.1	28.6	24.7	24.7	25.4	31.3
61-80 litres/day	24.2	19.5	24.7	16.5	23.9	21.6
81-100 litres/day	16.9	13.4	16.5	15.5	17.2	11.9
more than 100 litres/day	16.5	9.5	8.2	3.1	22.4	14.2
Total	100	100	100	100	100	100
Average per household (litres/day)	*67.7*	*57.7*	*60.7*	*51.2*	*72.7*	*62.4*
Average per h'hold member (litres/day)	*14.7*	*12.5*	*12.6*	*10.7*	*16.2*	*13.9*
Total water use (%)						
up to 50 litres/day	4.3	10.0	7.2	15.5	2.2	6.0
51-75 litres/day	22.1	23.8	25.8	27.8	19.4	20.9
76-100 litres/day	24.7	28.1	27.8	26.8	22.4	29.1
101-125 litres/day	19.0	16.9	17.5	15.5	20.1	17.9
126-150 litres/day	16.9	13.0	10.3	10.3	21.6	14.9
more than 100 litres/day	13.0	8.2	11.3	4.1	14.2	11.2
Total	100	100	100	100	100	100
Average per household (litres/day)	*102.4*	*92.4*	*94.8*	*83.2*	*107.9*	*99.1*
Average per h'hold member (litres/day)	*22.3*	*20.1*	*20.0*	*17.3*	*24.0*	*22.0*
Daily water consumption enough? (%)						
always	50.2	12.1	50.5	5.2	50.0	17.2
most of the time	41.6	15.6	37.1	10.3	44.8	19.4
about half of the time	4.3	30.3	4.1	28.9	4.5	31.3
mostly not	3.9	39.4	8.2	50.5	0.7	31.3
never	0	2.6	0	5.2	0	0.7
Total	100	100	100	100	100	100

Note: Averages are calculated using class middles.
Source: Survey 2010.

Table A.8 Water consumption characteristics by type of water source (%)

	Piped water on-plot (N=100)	Piped water off-plot (N=146)	Private water vendors (N=79)	Roof catch-ment (N=209)	Surface water (lake) (N=74)	Other water sources (N=17)	All water sources (N=625)
Distance to water source							
on-plot	93.0	2.1	n.a.[2]	100	0	11.8	56.2
<10 minutes walking	6.0	65.8	n.a.	0	36.5	0	23.6
10-20 minutes walking	1.0	24.7	n.a.	0	32.4	35.3	12.3
21-30 minutes walking	0	4.1	n.a.	0	12.2	11.8	3.1
>30 minutes walking	0	3.4	n.a.	0	18.9	41.2	4.8
Total	100	100	n.a.	100	100	100	100
Use of water[1]							
drinking	99.0	96.6	57.0	85.6	13.5	47.1	77.1
cooking	98.0	97.3	88.6	81.3	64.9	70.6	86.4
washing/cleaning	87.0	89.7	98.7	81.8	98.6	94.1	89.0
farming	0	0.7	0	0	0	0	0.2
Treat water? (% yes)	92.0	87.7	92.4	67.9	74.3	88.2	80.8
If yes, mode of treatment[1]	(N=92)	(N=128)	(N=73)	(N=142)	(N=55)	(N=15)	(N=505)
boiling	12.0	12.5	9.6	9.2	9.1	33.3	11.3
use of chemicals	95.7	98.4	97.3	90.1	94.5	93.3	94.9
filtering	27.2	28.1	35.6	36.6	21.8	33.3	30.9
solar disinfection	1.1	0	0	0	0	0	0.2
Problems – <u>wet</u> season							
unreliable	19.0	22.6	21.5	12.0	2.7	5.9	15.5
interrupted	22.0	27.4	19.0	15.8	2.7	0	17.9
insufficient	13.0	19.2	19.0	17.2	2.7	5.9	15.2
poor quality	30.0	30.1	43.0	22.5	85.1	47.1	36.2
source too far[3]	n.a.	39.7	n.a.	n.a.	63.5	23.5	47.7
price (too) high[4]	32.0	43.2	38.0	n.a.	n.a.	0	36.5
irregular billing[5]	51.2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
corruption[5]	46.5	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Problems – <u>dry</u> season							
unreliable	73.0	88.4	93.7	78.9	27.0	58.8	75.4
interrupted	77.0	89.0	86.1	61.7	24.3	35.3	68.5
insufficient	78.0	82.9	92.4	82.8	35.1	76.5	77.4
poor quality	64.0	67.1	94.9	67.9	93.2	76.5	73.8
source too far[3]	n.a.	61.6	n.a.	n.a.	90.5	70.6	74.7
price (too) high[4]	47.0	84.9	96.2	n.a.	n.a.	17.6	73.1
irregular billing[5]	67.4	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
corruption[5]	60.5	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Notes:
1) Totals add up to more than 100%.
2) Not applicable.
3) Excluding households with on-plot water source and private water vendors.
4) Excluding roof catchment and surface (lake, river) water.
5) Only households with individual (on-plot) connection.

Source: Survey 2010.

Table A.9 Problems with household water situation by area and by season (%)

	TOTAL (N=625[1])		Sofia (N=287[1])		Shauri Yako (N=338[1])	
	wet season	dry season	wet season	dry season	wet season	dry season
Problems (% yes)						
unreliable	10.7	19.8	11.8	12.5	9.8	26.0
interrupted	13.9	25.4	15.3	17.4	12.7	32.2
insufficient	12.5	24.2	15.0	21.6	10.4	26.3
poor quality	24.8	29.1	26.5	25.4	23.4	32.2
source too far (N=446/194/252)[2]	18.2	20.6	14.9	16.0	20.6	24.2
price (too) high (N=330/164/166)[3]	30.6	17.9	21.3	12.2	39.8	23.5
irregular billing (N=43/13/30)[4]	27.9	14.0	15.4	23.1	33.3	10.0
corruption (N=43/13/30)[4]	32.6	20.9	30.8	15.4	33.3	23.3
Serious problems (% yes)						
unreliable	4.8	55.5	7.0	65.2	3.0	47.3
interrupted	4.0	43.0	6.6	48.8	1.8	38.2
insufficient	2.7	53.3	4.5	60.6	1.2	47.0
poor quality	11.4	44.6	9.1	47.7	13.3	42.0
source too far (N=446/194/252)[2]	7.2	19.1	7.7	24.2	6.7	15.1
price (too) high (N=330/164/166)[3]	7.0	57.9	9.1	68.3	4.8	47.6
irregular billing (N=43/13/30)[4]	18.6	48.8	30.8	53.8	13.3	46.7
corruption (N=43/13/30)[4]	11.6	37.2	15.4	69.2	10.0	23.3

Notes:
1) Ns concern water sources.
2) Excluding households with on-plot water source and private water vendors.
3) Excluding roof catchment and surface (lake, river) water.
4) Only households with individual (on-plot) connection.

Source: Survey 2010.

Table A.10 Income-generating activities and water, by area[1]

	TOTAL (N=368)	Sofia (N=158)	Shauri Yako (N=210)
Average number of income-generating activities per household	1.6	1.6	1.6
Percentage of income-generating activities requiring water	27.7	24.1	30.5
	(N=102)	(N=38)	(N=64)
Types of activities requiring water (%)			
hotel business[2]	25.7	13.2	33.3
cleaning	16.8	26.3	11.1
fish-related	14.9	7.9	19.0
irrigation of crops	9.9	13.2	7.9
washing crops for selling	8.9	10.5	7.9
construction	7.9	10.5	6.3
hair saloon	5.0	10.5	1.6
preparing *mandazi*/*chapati*[3]	4.0	-	6.3
tenants' use	3.0	5.3	1.6
selling water	3.0	2.6	3.2
preparing *chang'aa*[4]	1.0	-	1.6
Total	100	100	100
Impact of water scarcity on activity (%)			
little or no effect	50.5	52.6	49.2
negative effect	48.5	44.1	50.8
positive effect	1.0	2.6	-
Total	100	100	100

Notes:
1) Ns concern income-generating activities.
2) These are small eating outlets common in many small and medium-size towns. They sell affordable tea, snacks and freshly cooked local food, mainly to travellers passing through the town and to people from the surrounding rural areas coming to town for services. These outlets are numerous in number and can be both formal (in a good building, with employees) and informal (family business, in a kiosk or makeshift shed).
3) *Mandazi* is a donut while *chapatti* is a flat bread.
4) *Chang'aa* is an illegal alcohol that is traditionally brewed in many parts of Kenya. The brew can be made from a variety of grains, malted maize and millet being the most common.

Source: Survey 2010.

Table A.11 Group membership, group activities and water, by area

	TOTAL (N=231)	Sofia (N=97)	Shauri Yako (N=134)
Percentage of households with person who is member of a group	43.7	38.1	47.8
	(N=110)[1]	(N=43)[1]	(N=67)[1]
Average number of group memberships per household	1.1	1.2	1.0
Types of group activities			
merry-go-round	38.2	51.2	30.0
social and/or economic welfare[2]	34.5	14.0	47.8
savings and credit	12.7	4.7	17.9
hiring out tents/chairs	6.4	14.0	1.5
farming and/or poultry keeping	4.5	7.0	3.0
empowering[2]	1.8	4.7	-
buying/selling vegetables	0.9	2.3	-
making bricks	0.9	2.3	-
Total	100	100	100
Percentage of activities requiring water	12.7	18.6	9.0
	(N=14)	(N=8)	(N=6)
In what ways is water required? (Ns)			
for farming/poultry activities	9	5	4
"we sell water"	2	0	2
mixing feeds, chemicals / cleaning	1	1	0
to make bricks	1	1	0
washing vegetables / cleaning	1	1	0
Impact of water scarcity on activity (Ns)			
no effect	3	2	1
lower productivity/income	6	2	4
animals' health affected	4	4	0
poor sanitation	1	0	1

Notes:
1) Ns concern households with person who is a member of a group.
2) Includes some cases involved in farming/poultry keeping.
Source: Survey 2010.

Table A.12 Urban crop cultivation and water, by area (%)

	TOTAL (N=231)	Sofia (N=97)	Shauri Yako (N=134)
Percentage of households cultivating crops	27.3	28.9	26.1
	(N=63)[1]	(N=28)[1]	(N=35)[1]
Size of the plot (in m^2)			
less than 1,000	25.4	35.7	17.1
1,001 – 4,000	39.7	39.3	40.0
more than 4,000	34.9	25.0	42.9
Total	100	100	100
Average[2] plot size (m^2)	*4,563*	*3,819*	*5,159*
Main crops cultivated[3]			
maize	76.2	79.3	71.4
beans	33.3	34.5	31.4
vegetables	27.0	41.4	14.3
sukuma wiki[4]	12.7	6.9	17.1
tomatoes	12.7	6.9	17.1
onions	7.9	3.4	11.4
nr. of crop types	*19*	*12*	*18*
Purpose of crop cultivation			
for own consumption only	63.5	71.4	57.1
for both consumption and selling	34.9	28.6	40.0
for selling only	1.6	-	2.9
Total	100	100	100
Percentage of crop-cultivating households irrigation crops	30.2	28.6	31.4
	(N=19)[5]	(N=8)[5]	(N=11)[5]
Source of irrigation water (Ns)			
tap	10	4	6
rain	3	2	1
lake	3	0	3
river	1	1	0
shallow well	1	0	1
water vendor	1	1	0
Impact of water scarcity on crops (Ns)			
no effect	3	0	3
negative effect	16	8	8

Notes:
1) Ns concern urban crop-cultivating households.
2) Averages are calculated using refined class middles.
3) Crops cultivated by at least 10% of the crop cultivating households in either area. Other crops included sorghum (4 households), cabbage (3), cassava (3), cowpeas (3), groundnuts (3), millet (3), banana (1), cotton (1), *dhania* (parsley) (1), okra (1), potatoes (1), sugar cane (1) and sweet potatoes (1).
4) Kale is popularly known as *sukuma wiki* in Kenya.
5) Ns concern urban crop-cultivating households irrigating the crops.

Source: Survey 2010.

Table A.13 Urban livestock keeping and water, by area (%)

	TOTAL (N=231)	Sofia (N=97)	Shauri Yako (N=134)
Percentage of households keeping livestock	28.6	37.1	22.4
	(N=66)[1]	(N=36)[1]	(N=30)[1]
Types of animals			
chicken	59.1	75.0	40.0
cows	34.8	36.1	33.3
goats	27.3	27.8	26.7
sheep	7.6	5.6	10.0
ducks	3.0	-	6.7
Average nr. of chicken (35 cases)[2]	*8.6*	*9.0*	*7.8*
Average nr. of cows (21 cases)[3]	*4.9*	*4.2*	*5.8*
Average nr. of goats (16 cases)[4]	*7.4*	*7.0*	*8.0*
Rearing system			
zero-grazing only	10.6	8.3	13.3
both zero-grazing and free range	18.2	11.1	26.7
free range only	71.2	80.6	60.0
Total	100	100	100
Purpose of keeping livestock			
for own consumption only	34.8	41.7	26.7
for both consumption and selling	59.1	55.6	63.3
for selling only	6.1	2.8	10.0
Total	100	100	100
Sources of animals' drinking water[5]			
piped water	80.3	75.0	86.7
rain water	13.6	19.4	6.7
lake	13.6	5.6	23.3
river	10.6	16.7	3.3
water vendors	4.5	8.3	-
borehole	3.0	5.6	-
Impact of water scarcity on livestock			
no effect	56.1	52.8	60.0
bad for the animals' health	21.2	22.2	20.0
takes more time to find water	15.2	22.2	6.7
lower productivity	6.1	-	13.3
have to buy water	1.5	2.8	-
Total	100	100	100

Notes:
1) Ns concern urban livestock-keeping households.
2) Excluding one household in Sofia with 450 chickens.
3) Excluding one household in Shauri Yako with 50 cows.
4) Excluding one household in Shauri Yako with 100 goats.
5) Totals exceed 100%.

Source: Survey 2010.

Table A.14 Water and health, by area (%)

	TOTAL (N=231)	Sofia (N=97)	Shauri Yako (N=134)
Types of water and sanitation related diseases mentioned by the respondent			
cholera	90.9	87.6	93.3
typhoid	97.4	94.8	99.3
dysentery	54.5	42.3	63.4
bilharzia	0.9	-	1.5
Percentage of households with at least one member who suffered disease this year[1]	26.1	20.8	29.9
	(N=77)[2]	(N=26)[2]	(N=51)[2]
Types of diseases suffered from			
typhoid	76.3	80.8	72.5
cholera	13.2	7.7	15.7
dysentery	11.8	11.5	11.7
Total	100	100	100
Percentage of disease cases with hospital treatment	96.1	92.3	98.0
Average[3] *hospital costs involved (in Ksh)*[4]	1,377	844	1,633
Impact of these diseases on the household[5]	(N=60)[6]	(N=20)[6]	(N=40)[6]
have to spend money on treatment	63.3	60.0	65.0
children miss school	35.0	35.0	35.0
miss work, hence less income	21.7	20.0	22.5

Notes:
1) "This year" means the first four months of 2010.
2) Ns concern cases of certain diseases.
3) Averages are calculated using class middles.
4) Ns concern sickness cases with hospital treatment (74, 24 and 50, respectively).
5) Totals exceed 100%.
6) Ns concern households with cases of water- and sanitation-related diseases "this year".

Source: Survey 2010.

Table A.15 Access to sanitation facilities by area (%)

	TOTAL (N=231)	Sofia (N=97)	Shauri Yako (N=134)
Type of sanitation facility			
traditional pit latrine	26.3	33.0	21.4
improved pit latrine	65.8	61.9	68.7
modern ablution	6.1	4.1	7.6
traditional & modern pit latrine	0.4	1.0	0.0
improved latrine & modern ablution	1.3	0.0	2.3
Total	100	100	100
Location of sanitation facility			
in the house	7.9	7.2	8.4
outside	92.1	92.8	91.6
Total	100	100	100
Distance between water source and pit latrine (if both on-plot)[1]			
up to 10 metres	76.3	74.6	77.5
11-25 metres	6.4	4.5	7.9
more than 25 metres	17.3	20.9	14.6
Total	100	100	100
Average[2] *(metres)*	*19*	*22*	*16*
Share facility?			
yes	74.9	71.1	77.6
no	25.1	28.9	22.4
Total	100	100	100
If shared, with how many households?	(N=173)	(N=69)	(N=104)
1-3	34.5	46.4	26.3
4-6	31.0	27.5	33.3
7-9	16.1	14.5	17.2
10-12	13.7	10.1	16.2
>12	4.8	1.4	7.1
Total	100	100	100
Average[2] *(households)*	*5.7*	*4.8*	*6.3*

Notes:
1) Ns are 156, 67 and 89, respectively.
2) Averages are calculated using class middles.
Source: Survey 2010.

Table A.16 Perceptions on the safety of drinking water, by type of water source and by area (%)

	TOTAL (N=231)	Sofia (N=97)	Shauri Yako (N=134)
Piped water			
very safe	12.6	13.4	11.9
safe	50.6	38.1	59.7
fairly safe	31.2	38.1	26.1
not safe	5.6	10.3	2.2
don't know	-	-	-
Total	100	100	100
Borehole water			
very safe	1.7	3.1	0.7
safe	12.6	12.4	12.7
fairly safe	43.3	36.1	48.5
not safe	32.0	34.0	30.6
don't know	10.4	14.4	7.5
Total	100	100	100
Shallow wells			
very safe	0.4	1.0	-
safe	3.0	2.1	3.7
fairly safe	12.1	15.5	9.7
not safe	75.3	69.1	79.9
don't know	9.1	12.4	6.7
Total	100	100	100
Water from private vendors			
very safe	0.9	2.1	-
safe	4.8	8.2	2.2
fairly safe	33.3	27.8	37.3
not safe	56.7	58.8	55.2
don't know	4.3	3.1	5.2
Total	100	100	100
Rain water / roof catchment			
very safe	10.8	14.4	8.2
safe	67.5	66.0	68.7
fairly safe	19.9	17.5	21.6
not safe	1.7	2.1	1.5
don't know	-	-	-
Total	100	100	100
Surface water (lake/river)			
very safe	0.9	1.0	0.7
safe	-	-	-
fairly safe	10.4	13.4	8.2
not safe	85.3	82.5	87.3
don't know	3.5	3.1	3.7
Total	100	100	100

Source: Survey 2010.

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